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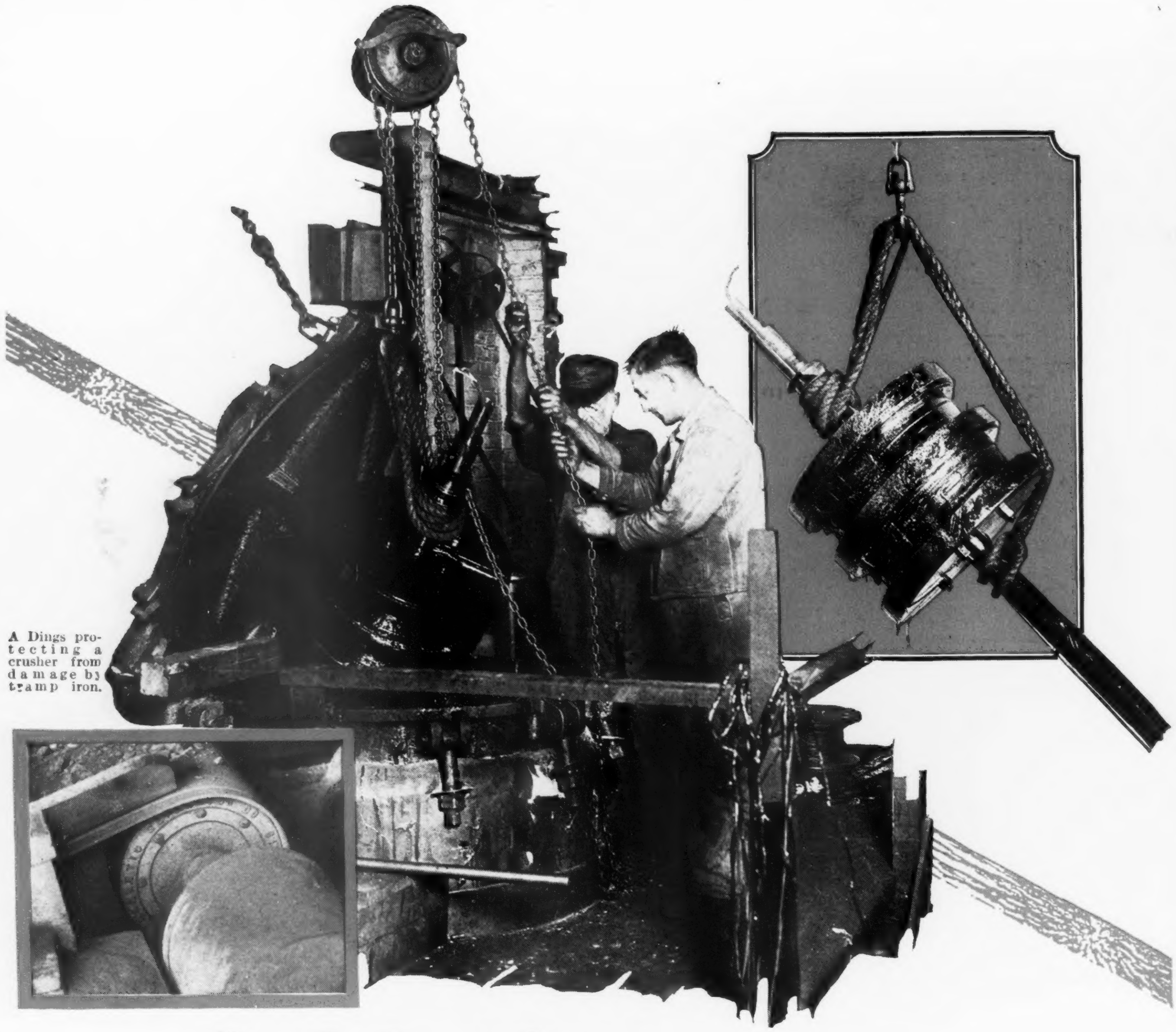

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Rock Products
CEMENT and ENGINEERING NEWS

Volume XXVIII Chicago, May 16, 1925 Number 10

"Cal"—A Commercially Successful Lime Product

Security Cement and Lime Company Makes a Portland Cement Rapid Hardener of Which Hydrated Lime Is the Basis

CAL is a compound added to portland cement mixtures to increase the workability and the rapidity of hardening. As the label on the bag has it, "It gives the same strength in half the time." This saving of time is an important matter in some cases, especially in city street and highway work where every day that a detour has to be used brings unhappiness to the motorist.

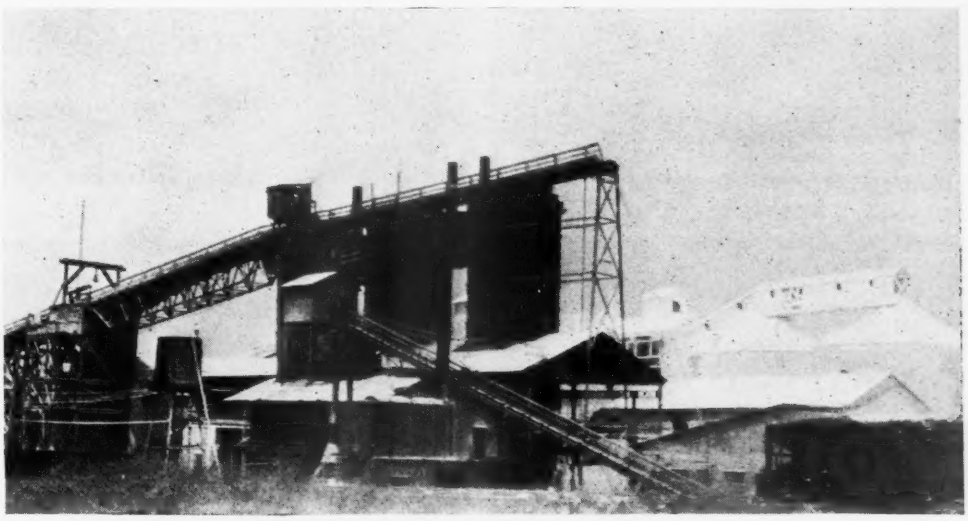
Cal is calcium oxychloride, the product resulting from the combination of calcium chloride and hydrated lime. The finished product contains 20% calcium chloride.

The process of making Cal is simple. Briefly, the process is to hydrate lime with a solution of calcium chloride and then to grind it very fine in a tube mill. And the plant is as simple as the process.

The Security Cement and Lime Co. of Hagerstown, Md., a year ago began the manufacture of Cal as an adjunct to its lime and crushed stone business. This company also operates the Security cement plant which was described in the issue of November 15, 1924. The lime plant is at Berkeley, W. Va., about 17 miles from Hagerstown.

The Berkeley lime plant has been in operation for several years and is widely known for the high grade of chemical lime that it makes. The greater part of its output is sold to tanneries and oil refineries, although building and agricultural lime are also produced.

The quarry is long and narrow, the ledge being almost vertical and lying between well defined walls. It is worked in two benches. Both well drills and tripod drills are used. Hand loading is practical, as it is necessary to keep the kiln stone free from any waste rock or strippings. A full description of the quarry and kiln practice of this plant



Lime kilns and hydrating plant of the Security Cement and Lime Co. at Berkeley, W. Va.

will be found in Rock Products issue of January 13, 1923. There are three kilns fired by producer gas, each kiln having its own Wood gas producer. The original installation was for hand firing and poking of the coal, but Chapman agitators were added later. Blowers supply the steam and air to the producers and excess steam is used for softening the flame.

The present shape of kilns and method of introducing gas into them is the result of considerable experimenting. The kilns are circular, the outside diameter being 20 ft. But they are bricked up so as to have a space 5x16 ft. with rounded ends. Four burners on either side of the kiln admit the air and gas.

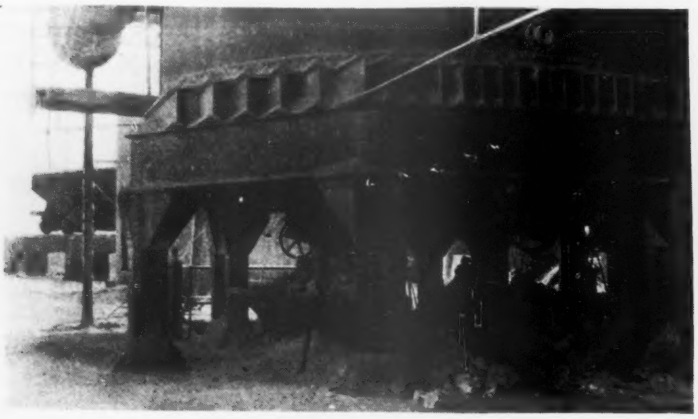
As compared with coal fired kilns, the ratio of product to fuel is not so good as with coal firing. It averages 4.25 to 1. Of course this ratio does not mean much unless the quality of the coal is known. The figure given is an average that is considerably bettered when a better quality of coal is available. The hydrator used is like that which will be described in the Cal plant except that it is larger. It has turned out as much as 250 tons of hydrate a day. Raymond air separation is used, and as the idea is to produce as high grade a material as possible, the beaters have been taken out of the Raymond pulverizers. This makes a considerable quantity of tailings, but it insures that the chemical lime is not contaminated by pulverized underburned or overburned lime or any foreign matter. These tailings are ground in a tube mill and sold for agricultural purposes. The finished hydrate is 99% through 100-mesh.

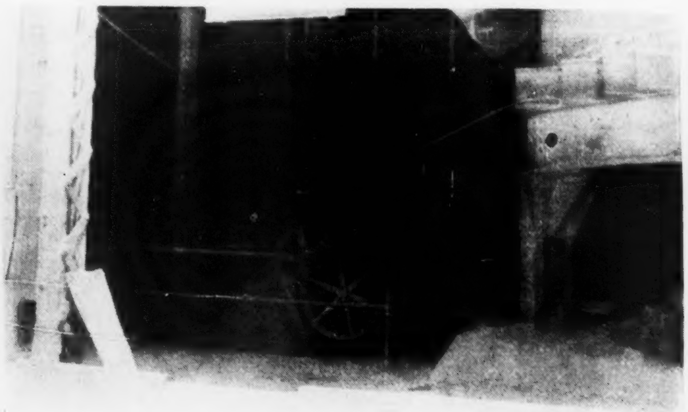
To return to the Cal plant, the lump lime drawn off from the kilns, broken in a Jeffrey hammer mill, is sent to the feed bin,

which is a steel cylinder with a hopper bottom. This discharge gate of this bin is over the mixer, which is where the process begins. This mixer is a revolving tub with paddles of a type developed for mixing fertilizer. A batch of lime is weighed in and a solution of calcium chloride of carefully controlled concentration is added from a measuring tank. The calcium chloride is a ing cylinder that looks like a small rotary kiln and was originally intended for a stone dryer. It was made by the American Products Co. On the inside are angle iron lifters by which the product is turned over and over and worked to the low end. This is the dryer and it is a small edition of the hydrator used in the main hydrating plant.

The discharge of the dryer is to the boot Co. and it takes the tube mill product, which is now Cal, to the sacking bin. A Bates valve-bag packer completes the installation. The plant has a capacity of 1000 tons of Cal per month.

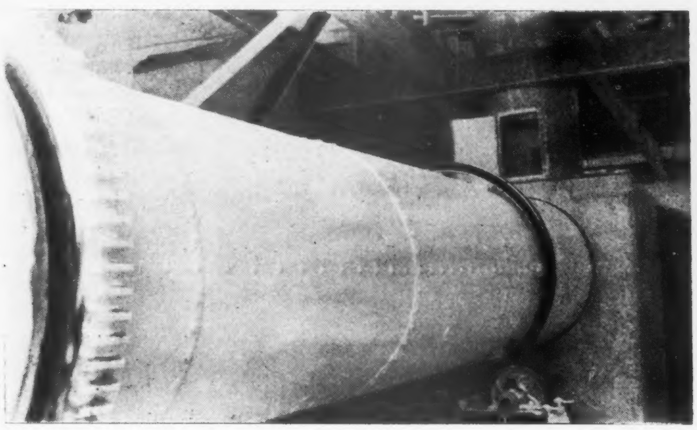
The layout of the plant is very neat. The hydrator and tube mill are in parallel, which makes a short and simple conveyor system from one to the other. The feed and fin-

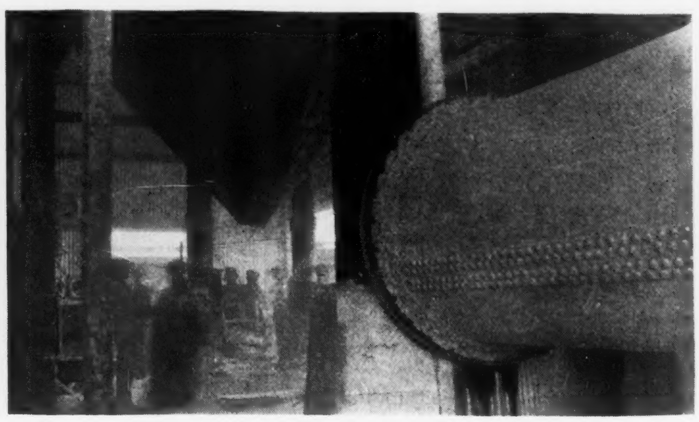




Left—Bottom of one of the kilns and draw shears. Right—Chain drag used for drawing lime from under kilns

Left—The mixer in which the calcium chloride and burned lime are mixed. Right—Cooling box at end of hydrator and flight conveyor that feeds the tube mill





Left—The hydrator below the mixer, originally built for a stone dryer. Right—The tube mill. Behind it is the elevator to the finished product bin. The conical bottom of this bin shows in the rear

byproduct of certain chemical industries. It is recovered in the form of a solution and shipped to the plant in tank cars. From these it is pumped to a big storage tank, which is under the mixer.

The mixed charge is dumped to a revolv- of a flight conveyor, which carries it to the Allis-Chalmers tube mill. There is no "return" on this mill, all the material going straight through to the discharge and out to the elevator. This elevator is of the steel enclosed dustless type made by the Link-Belt ished product bins balance one another and the space under the feed bin holds the calcium chloride storage tank so that while there is ample room to get around the place, there is no waste space anywhere. The building is of steel and concrete with steel

siding. It is joined to the main hydrating plant.

Two motors drive all the machinery; a 75-h.p. General Electric motor drives the tube mill and a smaller one of the same make drives the mixer and hydrator and conveyor. It is one of the interesting things about the whole lime plant that the motors are standardized. Only one make of motor is used and types and sizes of motors are kept to the minimum.

Albert Couchman, in charge of the Cal plant

The Cal plant is in charge of Albert Couchman, who also holds the position of safety director in the organization. E. F. Alderton is superintendent of the Berkeley lime plant and C. E. Nisewarmer is quarry foreman. The main office of the company is in Hagerstown.

The Louisville Cement Company Makes Hydraulic Lime for Plaster and Stucco

"WALSMENT" is the name under which the Louisville Cement Co. has just placed on the market a new mortar material for covering the exterior and interior surfaces of walls. It is a plastic combination of cements that, when applied, is practically impervious to water and may be employed in situations where other plasters are not efficient, for dampness does not cause it to scale or disintegrate. It is said to be practically a hydraulic lime, with added ingredients, the process of manufacture being similar to that of "Brixment."

When applied on metal lath to either the interior or the exterior of buildings, it forms a reinforced concrete covering which adds rigidity and which effects a saving of fuel by retaining the heat within the buildings. When applied to the interior walls, the surface is so hard that it is not easily scarred, which makes it particularly well adapted for use in schools and public buildings subjected to hard usage. When employed either in stucco or interior plaster, Walsment lends itself to any kind of finish desired.

When mixed on the job with the specified amount of sand and water, Walsment is ready to apply. It may be applied to wood lath, metal lath, brick, tile or concrete. For interior work it may be sand finished, white coated, troweled smooth for papering or given a natural finish. On exterior work it can be applied in the same manner as portland cement stucco, but with a more pleasing effect, according to its manufacturers. Its natural color is a light tan, pleasing to the eye and harmonizing well with light colored trim.

Unlike other plasters and stuccoes, Walsment in storage is not affected by age. It will not lose strength from the air, and it may be stored two years or longer without deterioration.

Walsment is packed in paper bags of 80 lb. each and in cloth sacks of 100 lb. each.

Gypsum as a Cure and Preventive of Animal Diseases

New Information on a Highly Interesting Subject

POSSIBLY some readers will recall the symposiums published in ROCK PRODUCTS, January 14, 1922, and June 28, 1924, on the effect of lime and gypsum dust on tuberculosis. Dr. W. E. Taylor, a well-known authority who was sent copies of those articles, has recently contributed for the Gypsum Industries, Chicago, some very interesting data on the use of gypsum dust as a cure for several animal diseases. He writes:

Gypsum for Tuberculosis

"One authority states that gypsum inhaled in the powder form has cured tuberculosis in human beings. The same authority further states that observations made by veterinarians in Germany support the contention that persons suffering from tuberculosis who have entered the employ of gypsum mills have been cured of pulmonary tuberculosis, and they also contend that if cattle afflicted with tuberculosis are permitted to breathe gypsum dust and gypsum is used in the barn to destroy the fumes of ammonia, that the cattle recover, and it is also recommended as a preventive of the disease. In view of the prevalence of tuberculosis among dairy cattle, the plan of using gypsum as a cure or preventive is worth while trying. A dust can be formed by using a dust gun or dust sprayer, once or twice daily. While I would not care to guarantee that gypsum will cure tuberculosis in cattle, I do feel, in view of what appears to be reliable evidence, that a trial is certainly worth while.

Gypsum for Foot-and-Mouth Disease

"German authorities make the statement that foot-and-mouth disease is not apt to occur where gypsum is properly used in the stables.

Gypsum for Poultry Diseases

"Gypsum is far superior to lime to use in the poultry house. Lime dust is an irritant, causing a rawness of the mucous membrance, making the poultry more subject to disease, while gypsum is palliative, disinfecting, and destroys the germs of disease. If scattered on the droppings it prevents the escape of ammonia, and if dusted in the poultry house it will keep the fowls' breathing apparatus in a healthy condition.

"Recently gypsum was tried out at my request and under my observation in the prevailing poultry disease. About two-thirds of the flock had died of the disease or were killed because of their serious condition, before the gypsum was used. Everything in the poultry house was dusted with gypsum and a liberal supply left on the floor mixed with the litter. Subsequently more applications were made. While I will not recommend gypsum as a sure cure, none of the chickens died after the second day, and after two weeks, the entire flock was perfectly healthy and has remained so since. Gypsum is now being used in the brooding house, where 200 young chicks are kept, and thus far none have died and all are well and thrifty. These demonstrations have convinced me, and the poultry man in charge of the chickens, that gypsum is a wonderful disinfectant having marked curative qualities."

Weather Forecasts Aid Quarry Operators

THE owner of stone quarries in Nebraska reports, through the Lincoln station, that weather forecasts are especially needed before heavy blastings, as stone brought down just before a rain or snow storm prevents the ground from drying under the shot, and the men have to work in the mud. Again, it is difficult to finish loading a shot after rain begins. Therefore, in wet weather the men ask at night, "Will we work tomorrow?"; and the engineers, "Shall we fire up in the morning?" Such questions are decided by the forecast.—*U. S. Department of Agriculture, Clip Sheet.*

Gas Producers in Lime Plants

Some Governing Considerations

By Victor J. Azbe
Consulting Engineer, St. Louis, Mo.

FOR lime kilns, a gas high in carbon monoxide and low in hydrogen is most desirable. Such gas will give a long and mild flame and will be inducive to the highest efficiency and the longest life of the kiln. While such gas is obtained in some plants, in most plants the opposite is true.

In some plants gas producers are large and combustion rates are small, so they can operate without using steam to blow the producer, which saves boiler coal and also results in better gas. Such plants as a rule are quite efficient from a fuel consumption standpoint. The elimination of using coal under boilers itself often results in an increase of half a ton of lime for every ton of coal burned in the producer.

Realizing all this, the following study was made with the idea in view of:

(1) How could steam use be reduced in gas producers.

(2) How could steam be entirely eliminated

Fuel Composition

This paper is based on the use of Franklin county coal of the following composition:

	%
Moisture	8.80
Fixed carbon	53.83
Volatile matter	29.85
Ash	7.52
Sulphur	1.13
Heat value as received	12222 B.t.u.

Producer Reactions

As the fuel is charged into the producer, it first becomes heated to where moisture is driven off in the form of vapor without any chemical change. When the fuel becomes more highly heated, the volatile matter distills off until only carbon and ash are left. All of this takes place on top of the fuel bed.

The carbon part of the fuel burns from the lower portion of the fuel bed. The air admitted below the producer first burns carbon to CO_2

$$C + O_2 = CO_2$$

Higher up in the fuel bed the CO_2 combines with a further amount of carbon to form CO.

$$CO_2 + C = 2CO$$

When steam is used with the air, the amount of vapor introduced in the producer depends upon the air temperature (Chart I). This vapor passes up into the combustion and decomposition zones of the producer where it decomposes into hydrogen and oxygen, but the oxygen portion combines immediately with further carbon to form carbon monoxide so the reaction really, when temperatures are right, is:

$$H_2O + C = 2H + CO$$

In decomposing water, the reaction is endothermic and 6900 B.t.u. are absorbed per pound of vapor decomposed while the reaction $C + O = CO$ is exothermic and 2980 B.t.u. are generated; the cooling of the fuel bed consequently is the difference, or $6900 - 2980 = 3920$ B.t.u.

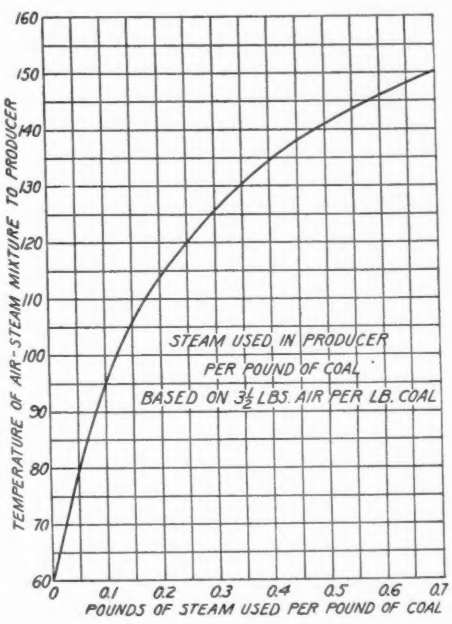


Chart 1, illustrating how amount of steam used depends on air temperature

Operating Condition I

If all CO_2 generated in the combustion zone were to be reduced to CO in the decomposition zone and the producer were to be operated so that no CO_2 would be formed, and no steam would be used, then the gas entering the distillation zone would contain only CO and nitrogen. Assuming that this is the case (which, however, is impossible practically), the following takes place:

Of coal fired, 92.48% goes off in gas and 7.52% remains on grate. The fixed carbon, 53.83% of each pound of coal fired, is converted to carbon monoxide. Since for each pound of carbon 5.76 lb. of air are necessary, the weight resulting from this partial combustion of carbon will be $0.5383 \times 5.76 + 0.5383 = 3.6383$ lb. and the heat developed will be $0.5383 \times 4450 = 2390$ B.t.u.

The weight of the volatile matter and moisture added to the weight of gas resulting from partial combustion of fixed carbon gives us a total weight of $(3.6383 + 0.2985 + 0.088) = 4.025$ lb. Assuming specific heat of this gas at 0.26, the heat content of 2390 B.t.u. above initial temperature will then give it a final temperature of 2285 deg. F.

This temperature is slightly reduced by the water in the coal, but only slightly if we assume that this water only evaporates but does not decompose. It is further reduced by radiation which will not be considered here and to an extent by the heat absorbed during the distillation process.

On this ideal basis, the sensible heat percentage is 19.55% of total heat in the coal and even if gas would be delivered cold, the efficiency of the producer system, not considering carbon in ash loss, would be 80.45%.

Operating Condition II

Even when no steam is used in ordinary practice, some of the carbon will burn to CO_2. In producers of this type, commonly 4% CO_2 is found and around 28% CO. Under these conditions about 10% of fixed carbon burns to CO_2 and 90% to CO. With the coal in question, the amount of heat generated will be $(0.10 \times 0.5383 \times 14500)$ 775 B.t.u. by C to CO_2 and $(0.90 \times 0.5383 \times 4450) = 2160$ B.t.u. by C to CO or a total of 2935 B.t.u., which is 76% of total heat in coal. Under these conditions, the weight of the gas will be greater $(0.10 \times 0.5383 \times 12.52)$ for C burned to CO_2 and $(0.90 \times 0.5383 \times 6.76)$ for C burned to CO and (0.2985 and 0.088) for volatile matter and coal moisture or a total of 4.323 lb. Assuming again a specific heat of 0.26, the resulting temperature will be 2600 deg. F. or 475 deg. F. higher than when no C is burned to CO_2.

To operate a producer with above temperatures, with clinkering coals, is impossible except at very low rates of combustion when radiation dissipates excess heat. Therefore, at high rates of combustion steam is used as a cooling medium, the idea being that steam will decompose which is an endothermic reaction requiring an absorb-

ing of heat from the fuel bed. The use of steam is, however, subject to abuses and complications. If steam would not cost anything, or if all steam would decompose and decompose by reaction $H_2O + C = 2H + CO$ everything would be all right, but this unfortunately is not the case because:

(1) To generate steam much coal is required from which no direct benefit is derived except that the steam operates the blower, and a blower as a general rule is a very inefficient apparatus for blowing air.

(2) Much of the steam passes through the fuel bed without being decomposed, and this steam does actual harm.

(3) When fuel bed conditions are right, most of the steam will combine with carbon to form carbon monoxide and hydrogen, but usually conditions are not right and CO_2 and hydrogen are formed with a greater amount of heat evolved, thus partially cancelling the cooling effect of the steam which further results in leaner gas.

Operating Condition III

Let us further assume that 0.3 lb. of steam is used per pound of coal and that this steam will all combine with the fixed carbon of the coal to form CO as per expression:

$$C + H_2O = CO + H_2$$

The 0.3 lb. of steam will contain 0.27 lb. of oxygen and 0.03 lb. of hydrogen. The oxygen will combine with $\left(\frac{0.27}{1.333} = 0.203\right)$ 0.203 lb. of carbon, leaving (0.5383 — 0.203) 0.3353 lb. to combine with the air.

In the steam-carbon reaction, the heat absorbed by decomposing water will be $\left(\frac{6900}{0.3}\right)$ 2300 B.t.u. and the heat generated by recombination of oxygen with carbon will be (0.203×4450) 904 B.t.u., so the net cooling will be 1496 B.t.u.

The heat generated by the remaining carbon if burned, 0.9 lb. to CO and 0.1 lb. to CO_2, will be $\left(2935 \times \frac{0.3353}{0.5383}\right)$ 1830 B.t.u., so we have:

	B.t.u.
Heat absorbed by decomposing water	2300
Heat generated by combining carbon with air	1830
Heat generated by combining carbon with hydrogen from water	904
Total heat generated	2734
Net heat generated appearing as sensible heat	434

The weight of gas including carbon, air, volatile matter, steam and vapor will be $(0.3353 \times 5.76 + 0.203 + 0.3 + 0.2985 + 0.088)$ 2.82 lb. and 434 B.t.u. distributed over this amount of heat without radiation will give a temperature of 775 deg. F.

Operating Condition IV

The above conditions would be ideal if they were possible. The gas would be rich and low in temperature but this low temperature makes the desirable reaction $C + H_2O = CO + 2H$ impossible so reaction $C + 2H_2O = CO_2 + 2H_2$ takes place.

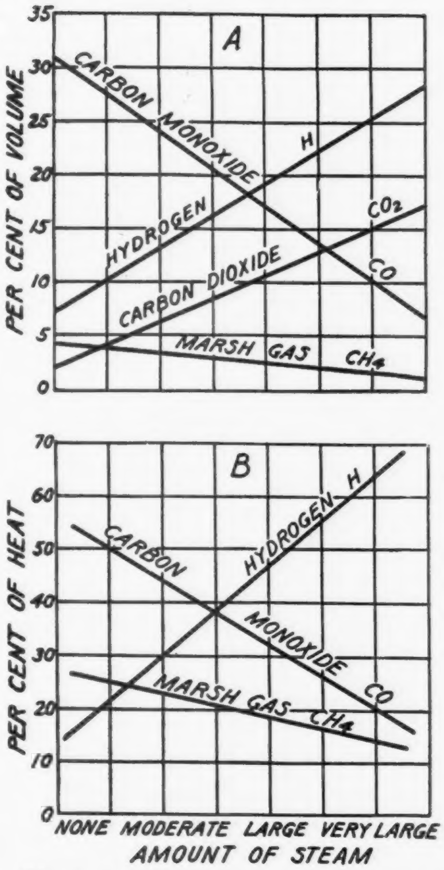


Chart 2—Approximate variation of composition of producer gas and heat distribution between its different components with different amounts of steam

With the same amount of steam in this last reaction, the same amount of hydrogen is formed and the same amount of heat absorbed. The oxygen from the steam, however, combines with only $\left(\frac{0.27}{2.667}\right) = 0.1005$ lb. of carbon when 1460 B.t.u. are generated. The remaining carbon combines with air to form CO and CO_2. Again, in the assumed ratio of 0.9 to 0.1 and the heat generated is $2935 \times \left(\frac{0.4333}{0.5383}\right)$ 2360 B.t.u. Consequently total heat generated is $(2360 + 1460) =$ 3820 B.t.u. and heat absorbed 2300, leaving 1520 B.t.u.

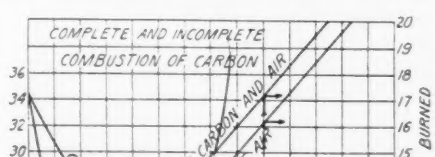


Chart 3—Complete and incomplete combustion of carbon

The weight of the gas in this case will be $(0.4333 \times 6.76 - 0.105 + 0.3 + 0.2985 + 0.088) = 3.75$ lb. and resulting temperature 1570 deg. F.

This gas will be relatively low in CO and high in CO_2 and hydrogen, characteristics of which are shown on Chart II. For lime kiln conditions, it generally will be less desirable. Its volume will be greater and its heat value lower. Its tendency will be to burn with shorter flame, more intense and less radiant, while the efficiency of the producer will be good $100\frac{1520}{12220}$ — 80.4% on a cold gas basis; if the coal for steam boiler is considered, the efficiency will be lower. This especially, if fuel bed is thin when much steam will pass through without being decomposed.

In view of the fact that the CO_2 reaction predominates at low temperatures, the conclusion would be that the fuel bed should be maintained as hot as it is safely possible. Further, it is well known that a deep fuel bed will decompose steam and CO_2 better due to greater time of contact, consequently "high temperature and deep fuel beds tend to produce a gas low in CO_2 and low in H_2. Under these conditions a minimum amount of steam will be necessary. Low temperatures or shallow fuel beds produce a gas low in CO and high in CO_2 and H_2. The more the producer is forced, the worse will be this condition and the more steam will be needed.

Operating Condition V

In every producer temperatures are kept down by decomposition of steam and decomposition of CO_2. Why steam has to be used is that the amount of CO_2 cooling in producer is insufficient. If CO_2 could be supplied from an outside source, no steam would be needed. The only objection to this method is control, which problem, however, becomes simplified due to possible constant supply of gas rich in CO_2 obtainable from the kilns. This method is entirely practical and B. E. Eldred and C. Ellis patented it in 1905.

Under condition IV, it was stated that cooling effect of steam is 1496 B.t.u. The cooling effect of CO_2, combining with carbon, is 10,100. So for an equal cooling effect, only 0.148 lb. of CO_2 would be necessary. Since kiln waste gas contains by weight about 40% of CO_2 and 60 nitrogen, a total of 0.368 lb. of this mixed gas would have to be used. This is only slightly more than the amount of steam used. In terms of volumes, about one-sixth of kiln gas and five-

sixths of air would give the proper ratios for satisfactory operation.

Under the proposed system, a centrifugal blower would have to be used, electrically driven, but the power required would be only 1½ h.p. for every 10 tons of coal burned in producer and the cost of power insignificant. The gas would be high in CO, it would have a long flame which is much more desirable in lime kilns. The flame would be more luminous and so a better transmitter of heat. Kiln life would be longer since less heat would be evolved immediately in the eyes of the kiln. Operation would not be so noisy and a better control would be possible.

The System Tried Out

The writer tried this system in a lime plant and results obtained were far better than was expected. The coal burned was Franklin county screenings. There was no difficulty with the producer control, steam was entirely eliminated, producer efficiency was increased and in addition the kiln's performance in output and efficiency was greatly bettered.

Volatile Matter—Its Effect on Lime Kiln Efficiency

By Victor J. Azbe

(Continued from April 18)

If the plant is well operated, if the kiln is fired frequently, say once every 15 minutes, and the fire maintained in good condition, that is, the grate fully covered, and if furnace walls and kiln walls are tight, then unfortunately the ratio of lime to coal will still be poor. In the first case which has been mentioned, that is, of excess air, the primary cause for poor conditions and for waste is the man and his careless operation. In the second case when operation is apparently very good, one cannot blame the man. The blame must be placed upon volatile matter in the coal. The reason is incomplete combustion due to improper supply of secondary air.

For direct fired kilns, a solution of the above difficulty would be to supply a variable amount of secondary air. Each furnace would have an opening through which air might enter above the fuel bed. The size of this aperture would be controlled by a device which would admit the full required amount of air immediately after the coal was fired then gradually reduce the amount, until after a certain number of minutes, no, or only a very small amount, of secondary air would be supplied. If the firing was regular once every 15 minutes, if fuel bed was maintained in good condition and if about the same amount of coal were to be fired every time, this system would work well and be entirely automatic. The same conditions could be obtained if the fireman would close the firing door gradually, but the difficulty is that no fireman will do this properly. But this system would mean complications and complicated kiln operations as a rule are not a success for long.

Larger size coal from which the gas escapes more slowly due to the time that is necessary for the heat to penetrate into the lumps would also help to overcome "irregularity," but in view of the fact that such coal is usually more expensive, the smaller sizes should be used and the automatic method worked out.

In case of gas producers, it is important that the fuel bed be thick enough to prevent any burning through, which would raise the temperature in the upper zone and cause volatile matter to be driven off much more unevenly. It also appears that with gas producers of any kind the secondary air supply will have to be positive, that is, under full control and that producer operation will have to be regular and its firing frequent. If this is not followed, volatile matter evolution will be irregular; then, even if secondary air supply is regular, the best results will not be obtained. If, however, secondary air supply is not positive then the air will vary also and results will be still poorer.

The ideal system is a continuous one, one that will charge coal once a minute. With this system, if the air supply is properly proportioned, the best results should be obtained. Then volatile matter will become an asset instead of a liability, due to the desirable long radiant flame characteristics which would be obtained.

Specifications for Lime for Use in Sugar Industry

IN the circular of the Bureau of Standards No. 207, issued recently, recommended specifications are given for limestone, quicklime, lime powder and hydrated lime for use in the manufacture of sugar.

Lime is used either to precipitate impurities from the juices or sirups or, in the Steffen process, to precipitate the sugar from impure solutions. For the former purpose lump lime or hydrated lime may be used; for the latter purpose fine lime powder is required. In the Steffen process both lime and carbon dioxide are used so that they are usually purchased together as limestone; the carbon dioxide liberated in the kilns is used later to precipitate out the lime which has been used to remove the sugar from its impurities in the form of calcium saccharate.

In whatever form the lime is used, it must have a high calcium content as shown in the following table of composition requirements.

	Sugar soluble lime minimum, per cent	Magnesium oxide, maximum, per cent	Loss on ignition per cent
Limestone* for Steffen process	90	3	....
Limestone for other purposes	85	3	....
Quicklime for Steffen process	90	3	2
Quicklime for other purposes	85	3	5
Lime powder	90	3	2
Hydrated lime	85	3	....

*Limestone is calcined before analysis.

Methods of packing, marking, sampling and testing are also outlined in this circular, additional copies of which may be procured from the Superintendent of Documents, Washington, D. C., for 5 cents per copy.

Government Specification for Hydrated Lime for Structural Purposes

THE Bureau of Standards has recently issued circular No. 204 giving the United States government specification for hydrated lime for structural purposes. The two types—masons and finishing—are defined and requirements as to chemical composition, fineness, soundness and plasticity given. Methods of sampling and determining the above qualities are included in the text along with marking and packing specifications.

Additional copies are obtainable at 5 cents per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C.

New York Lime Producers to Operate North Carolina Mica Deposit

DONALD WOODWARD and J. L. Heimlich, joint owners of the Le Roy Lime and Crushed Stone Corporation, Le Roy, N. Y., have organized the Rhodolite Co. to produce abrasives from a mica deposit at Willits, N. C.

This mica deposit was purchased by Mr. Woodward about a year and a half ago and was previously used as a source of abrasives, according to the Rochester, N. Y., *Democrat and Chronicle*, but such crude methods were used in the process of manufacture that the business had to be discontinued.

After purchasing the deposit, Mr. Woodward organized the Rhodolite Co., which has constructed a modern crushing and grinding plant and will begin operations immediately, the owners having left Le Roy recently to open the plant.

Insulation of Lime and Cement Kilns

Discussion of the Factors Governing Heat Losses and Methods of Insulating Shaft and Rotary Kilns

By Edw. A. Phoenix
Celite Products Co., Los Angeles, Calif.

UNTIL a comparatively few years ago, radiation losses from heated equipment were considered an uncontrollable source of waste. Operators knew these losses existed, but they were considered as a matter of course and few positive attempts were made to determine what they were actually costing in dollars and cents. The first intelligent attempt at reducing heat losses in modern industry was the use of insulation for covering steam pipes. Even this development is comparatively recent, although at the present time practically all steam pipes are covered with insulating material of some kind. During the last ten or fifteen years, however, there has been a broader and much more important application of heat insulation in equipment operating at temperatures far above that of steam and for which materials originally developed for insulating at steam temperatures, are not suited. Included in this classification are kilns of various types, boilers, furnaces, oil stills, gas and glass equipment, etc., which are operated at temperatures of from 1000 to 3000 deg. F.

Factors Affecting the Quantity of Heat Lost

Heat tends to flow from a region of high temperature to one of low temperature just as electricity at high potential dissipates itself unless suitable insulation is used. In the loss of heat from the shell of a vertical shaft kiln there is involved, first, the transmission of heat through the wall to the outer surface; and second, the giving out of that heat from the shell to the air, which carries it away.

The quantity of heat transmitted by conduction through a wall varies directly with the area of the wall, the temperature difference between the hot and cold surfaces of the wall, the thermal conductivity of the material of which the wall is composed, and, inversely, with the thickness of the wall.

Radiation losses increase rapidly with rise in temperature and it is consequently increasingly important to reduce heat losses at the higher temperatures. The increase in radiation loss with increase in temperature is very clearly shown on a curve prepared by C. R. Darling,[1] giving heat losses from metal surfaces at various temperatures (Fig. 1). It will be noted that the steel casing of a kiln at 360 deg. F. (atmospheric temperature 70 deg. F.) will radiate 1000 B.t.u. per square foot per hour; whereas, if the temperature is reduced to 180 deg. F., the loss is only 240 B.t.u. per square foot per hour. It is therefore important to reduce the exterior temperature to the lowest possible minimum.

[1] "Engineering," London, 1912.

Use of Insulating Materials

A good refractory material is essentially strong and dense and is consequently

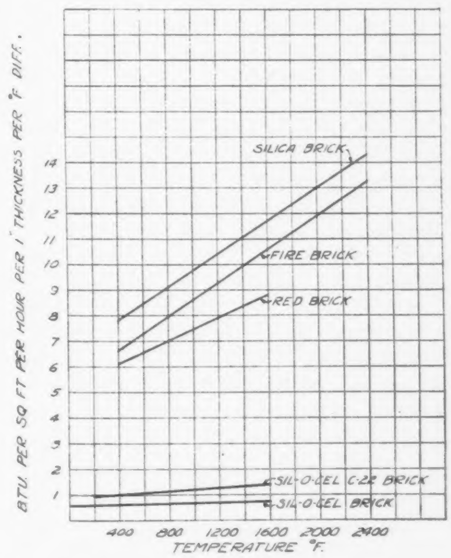


Fig. 2—Relative thermal conductivities of red brick and refractories at different temperatures

highly conductive. In order to prevent excessive heat loss, a wall must either be built up of great thickness, which is costly, gives an inelastic wall and absorbs a large amount of heat not used in productive work, or be built to include as a component of the wall, a layer of some material of lower thermal conductivity, called the insulator.

The rate of heat flow through a wall depends upon the resistance of the component materials to the heat waves. Generally speaking, a material having a low apparent density is considered to be a good insulator. Most such materials contain a number of small "voids," or cells, holding air. There is danger, however, of having the cells too large and having radiation across the spaces and convection currents within the cells, which increase the apparent conductivity. Roughly speaking, if the cells are large enough to be seen with the naked eye, they are large

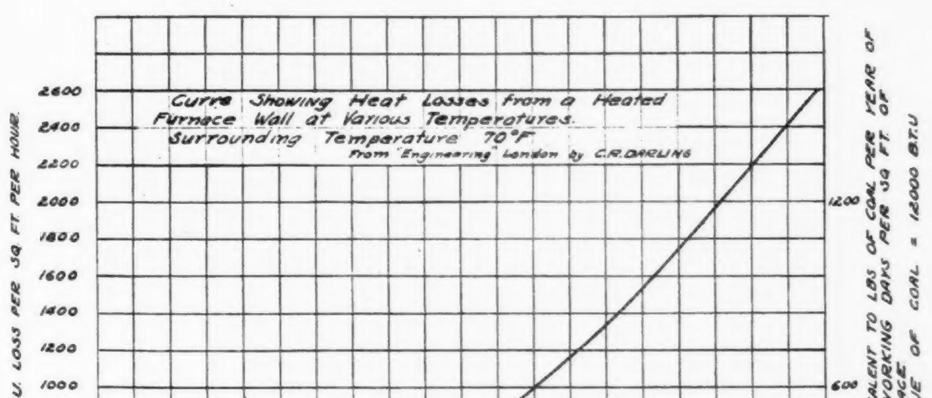


Fig. 1—Darling's curve of heat losses from metal surfaces at various temperatures

enough to be instruments of heat transfer by radiation and convection.

The relative thermal conductivities of representative refractory and insulating materials are shown in Fig. 2. The lines showing the conductivities of red brick and the refractories illustrate the rapid rate of increase as the operating temperature increases. It will be noted that the insulating brick averages about 12 times as effective in retarding the passage of heat as the refractory. The low conductivity of this insulating material is due to the fact that it contains a volume of as much as 85% of infinitesimal air cells

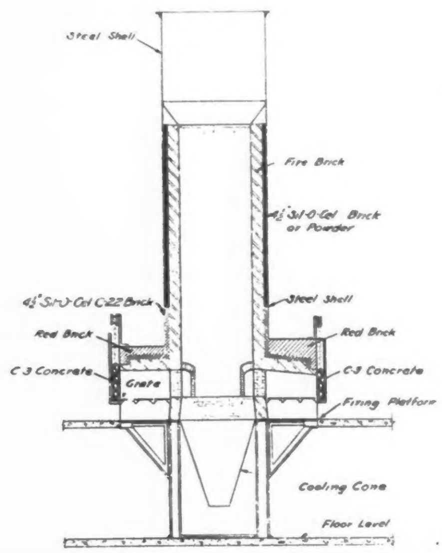


Fig. 3—Recommended method of insulating shaft kilns

which effectually break up the heat waves. The term "infinitesimal" is used advisedly as it is estimated that there are from forty to fifty million of these cells in each cubic inch of the natural rock. Being practically pure silica (SiO_2) the material has a high melting point, 2930 deg. F., as determined by the Bureau of Standards. This permits its use as insulating material in practically all types of heated equipment. It is recommended strictly as an insulating material, however, and in no case should the refractory linings be eliminated, principally due to the fact that insulating materials are not physically constituted to withstand a great deal of abrasion. On the other hand, the crushing strength is unusually high, averaging over 400 lb. per square inch for the brick form.

Calculating Rate of Conduction Through Walls

In most cases the substitution of a 4½-in. course of insulating brick for a course of common brick in heated walls will cut down the loss by 65 to 70%. The comparison in heat loss between an insulated and an uninsulated kiln wall will be given below, losses being figured by the well-known formula for conduction through walls composed of two or more materials of varying conductivities:

$$H = \frac{T_1 - T_2}{\frac{d_1}{c_1} + \frac{d_2}{c_2}}$$

Where H is the heat loss in B.t.u. per square foot of wall per hour, T_1 is the temperature of the interior of the furnace and T_2 is the temperature of the air surrounding the outside of the furnace wall. $\frac{d_1}{c_1} + \frac{d_2}{c_2}$, etc. = thickness in inches of each course of material divided by the conductivity in B.t.u. per inch of thickness of that course.

This formula covers the conductivity of the structural materials, emissivity or inner and outer surface resistances being disregarded for purposes of comparison.

Assuming a kiln wall at an average temperature of 1800 deg. F. (temperature of air 70 deg. F.), with walls constructed of 9 in. of fire brick and 8 in. of red brick, taking the conductivities of the various components at their approximate mean temperatures from the chart Fig. 2 and substituting for the formula we have:

$$H = \frac{1800 - 70}{\frac{9}{10} + \frac{8}{6.5}} = 800 \text{ B.t.u. per square}$$

foot per hour. Exterior temperature 320 deg. F.

If, on the other hand, the wall were composed of 13½ in. of fire brick (the last 4½ in. of which could be second quality), and 5 in. of Sil-O-Cel insulating brick or powder next to the shell, the heat loss would be:

$$H = \frac{1800 - 70}{\frac{13.5}{10} + \frac{5}{.65}} = 190 \text{ B.t.u. per square}$$

foot per hour. Exterior temperature 170 deg. F.

In other words, without increasing the total thickness of the wall, the heat loss is cut down 76% from that of the uninsulated construction.

Fuel Savings in Shaft Lime Kilns

A fuel ratio of 4 to 1 is good average lime kiln practice. With coal at a cost of $5 per ton, this means losses from uninsulated kiln walls have been variously estimated at 15 to 25% of the total fuel fired. A complete heat balance advanced by Richard K. Meade[2] is shown below:

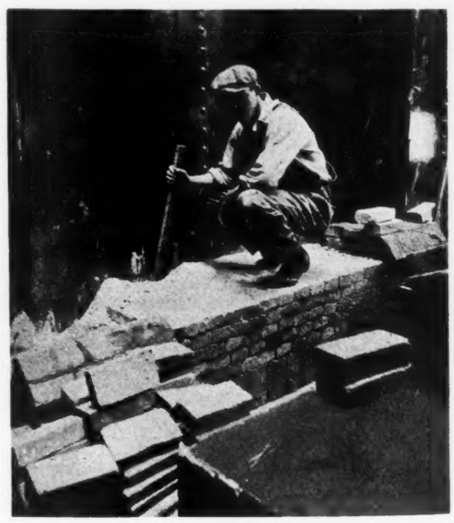
	Per cent
Lost in incomplete combustion	11
Lost in exit gases	22
Lost in hot lime	11
Lost by radiation	17
Utilized in burning lime	39
	100

Using the above figure of 17%, the radiation loss per ton of lime produced amounts to 21 cents. By the use of suitable insulation this loss can be cut down approximately 75%, resulting in a net saving of 16 cents per ton of lime. In a kiln producing 16 tons of lime per day, this saving would amount to approximately $925 per year. The cost of the insulation necessary to effect this fuel saving would be less than half the yearly saving. In other words, the return on the investment is over 200% per year. The material will not deteriorate and will last as long as the equipment itself.

Methods of Insulating

Fig. 3 shows the method recommended for insulating vertical shaft kilns. The average thickness of kiln walls is 27 in. where insulation is not used. In insulated walls consisting of 13½ in. of firebrick and 5 in. of Sil-O-Cel insulating brick, a total of 18½ in., the saving of labor and material due to decreased thickness amounts to considerably more than the cost of the insulation. If the masonry is reduced by only one course in additon to the course displaced by Sil-O-Cel, the first cost is in favor of an insulated kiln. Further, decreasing the thickness of the masonry results in a direct increase in burning volume. With the comparative wall thicknesses mentioned, namely, 27 in. and 18½ in., a 10-ft. kiln with the thinner lining would show an increase in burning volume of about 30%.

Some plants and consulting engineers prefer Sil-O-Cel powder, or "coarse grade," which is packed between the fire-



Packing insulating material between shell and lining

brick lining and the shell in a layer of 4 to 5 in. If powder is used, it should be tamped carefully to insure all space being thoroughly filled. This will prevent any tendency of the powder to settle as a result of jars or vibration.

The furnace section of the kiln, which operates at a high temperature, should be

[2] Journal of Industrial and Engrg. Chem.—August, 1921.

lined with 13½ or 18 in. of first grade firebrick backed up with 4½ in. of Sil-O-Cel C-22 brick. This latter material is a calcined product capable of standing temperatures of approximately 2000 deg. F. without shrinkage. Insulation of the furnace chamber results in much more comfortable working conditions on the platform.

Additional Advantages of Insulation

The use of insulation helps meet the commercial requirement for a clean, white

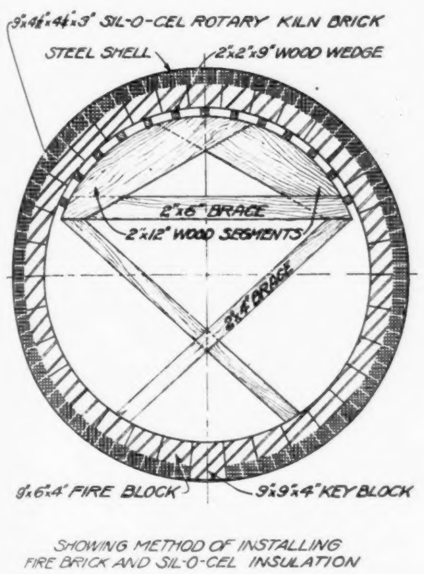


Fig. 5—Method of lining upper part of rotary kiln

lime with no "core" or unslakable lumps. An insulated kiln is blanketed against weather conditions and other factors which interfere with temperature control. Lime, especially if it contains impurities, is exceedingly sensitive to over-burning. In order to obtain both economical production and quality, temperatures must be controlled within a very small range, and this is made possible by efficient insulation. Furthermore, insulation results in more uniform temperatures throughout the various parts of the kiln; the heat which cannot escape tends to distribute itself uniformly. It is therefore unnecessary to force the firing in order to eliminate cold spots in the kiln.

Sil-O-Cel, being more than 80% dead air, has a cushioning effect against the firebrick and prevents shearing of the rivets on the inside of the shell. Furthermore, the shell is protected against excessive temperatures, which naturally increases its life.

Insulation of Rotary Kilns

The insulation of rotary lime and cement kilns is an entirely different problem from a structural standpoint. Average temperatures are higher and the problem is further complicated by the fact that the kiln revolves and the lining is subjected to vibration while the kiln is in operation.

In the cement industry, fuel is one of the principal items of cost, and the economical utilization of fuel is receiving close attention, not only by the individual plants but also by the Fuel Conservation Committee of the Portland Cement Association. The majority of cement plants today, and practically all of them built in recent years, have used insulation to this end.

It has been estimated by various authorities that the amount of heat lost through the kiln lining is from 16.3 to 30% of the total heat generated from the fuel.[3] In those portions of the kiln which are insulated properly this loss can be cut down 60 to 70%. In one plant where a direct check was made on operation of a kiln before and after insulating, the total fuel consumption was reduced by 10 lb. of coal per barrel of cement produced.

In cement plants utilizing waste heat from rotary kilns, the savings which have been secured vary from 12 to 15 lb. of coal per barrel as a result of insulating kilns, waste heat flues and boilers. In plants not equipped with waste heat boilers, kilns that are effectively insulated can be operated with 5 to 10 lb. less coal per barrel of cement produced.

Special Rotary Kiln Insulating Brick

Sil-O-Cel insulating brick (not calcined) have been used for a number of years for insulating rotary kilns, with satisfactory results. However, with the larger diameter kilns which have come into general use in the past two or three years it was felt that a special brick could be made that would be more satisfactory. Sil-O-Cel rotary kiln brick were especially designed for this purpose. These brick are produced by cutting the natural form of Sil-O-Cel to a special size and then burning them in a kiln. This not only eliminates possibility of shrinkage at high temperatures but also results in a brick that is more dense and rugged, the crushing strength being approximately 1000 lb. per square inch. They can be used without danger of shrinkage where they are subjected to temperatures as high as 2000 deg. F.

Sil-O-Cel rotary kiln brick are furnished in the size 9x4½x3 in. and are chamfered on one face to a width of 4¼ in. to insure a tight joint between bricks laid against the curvature of the shell.

Method of Insulating

Due to the very high temperatures in the lower end of the kilns, or the burning zone, the limitations of present commercial refractories have precluded the general use of insulation in this section of the kiln. In one plant at the present time Sil-O-Cel is being used throughout the burning zone in back of 6 in. of a very high quality refractory and up to the present time, after six months' operation, the refractory is in perfect condition. With the present first quality fire clay refractory used generally for this purpose, insulation is not recommended in the burning zone. If a block of sufficient refractiveness is used, however, insulation is especially desirable in this section of the kiln due to the higher temperature and correspondingly greater loss if uninsulated.

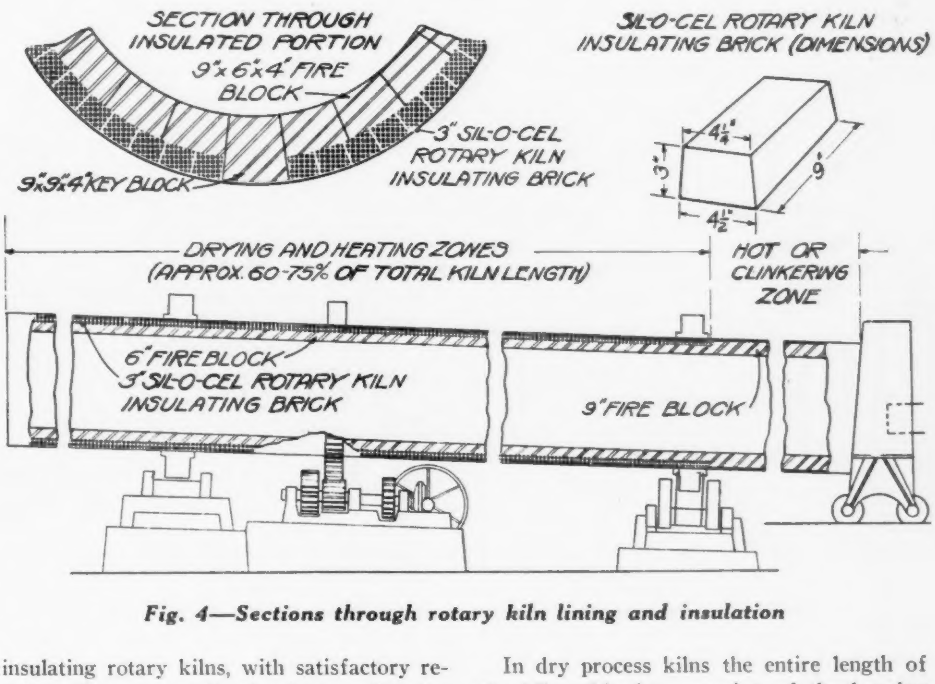


Fig. 4—Sections through rotary kiln lining and insulation

In dry process kilns the entire length of the kiln with the exception of the burning zone is insulated with Sil-O-Cel rotary kiln brick in back of 6 in. of fire block as shown in Fig. 4. It is especially important to key the fire block tightly to prevent any shifting of the lining due to inertia when the kiln is started and stopped. One method which has been used is to install a course of fire block keys 9 in. thick, running the entire length of the insulated section and extending through the insulation to the shell. In

[3] Baylor, Trans. American Institute Chemical Engrg., Vol. X, p. 214; Richard K. Meade, Portland Cement, p. 174; Soper, Journal American Society of Mechanical Engineers, October, 1910; Dorman, Tonindustrie, Ztg. 38, 405-6.

other cases, however, engineers prefer to eliminate this through key course and rely entirely on anchoring the lining by tightly laid brick work.

In kilns having projecting rivet heads, the rivets on the inside surface should be covered with a coating of cement mixed with fire clay to fill the irregularities between the rivet heads and the steel shell. This coating will form a hard and solid bed for the insulation. The insulating brick to be laid over this portion of the shell surface should be split to the proper thickness so that the inner face of these brick will be flush with the surface of the adjoining insulating brick.

The insulating brick should be laid with the 9-in. dimension running longitudinally to the shell and each adjacent course of insulating brick should be laid with staggered joints. After the lower half of the shell has been lined in a section about 6 ft. long, the refractory lining should be installed in rings so that each insulating brick is in contact with more than one refractory ring. The longitudinal joints in each refractory ring should be staggered with reference to the adjacent rings, but the rings should not be bonded together.

In lining the upper half of the kiln several methods have been employed. One method consists in blocking the lower half of the lining to prevent shifting and then rotating the kiln to permit laying the balance of the lining. The disadvantage of this method is that it is often difficult to key tightly the refractory blocks and insulating backing.

A much more satisfactory method is to build a scaffold for the workmen to stand on so that they may easily reach the upper surface of the steel shell. A segment as shown in Fig. 5 should then be constructed and held in place by diagonal supports so that the upper surface of the wood segment is a little more than 9 in. from the shell surface. This space provides for the 3 in. of insulation and 6 in. of refractory block, plus a small space to permit wedging.

In starting from the brickwork which has already been laid in the bottom half of the kiln, it is advisable to lay the refractory blocks with as little fire clay mortar as possible, with no mortar against the insulating brick. After the refractory blocks have been laid in place, supported by the wood segment, the insulating brick should be slipped in between the refractory and the shell. After sufficient insulating brick have been pushed snugly into place to cover the refractory block beneath, wooden wedges should be driven between the refractory and the wood segment, thus forcing the refractory block against the insulation. As this is done, the insulating brick are pinched between the refractory block and the steel shell and it is then an easy matter to drive the insulating brick in still tighter, both longitudinally as well as circumferentially. At the top of the kiln lining the last one or two insulating brick can be cut to fit the space remaining.

Fig. 6—Showing how the insulating brick are held between the shell and the lining

This method has given very satisfactory service wherever used and the extra time required in placing the lining is more than warranted because the lining can be more tightly keyed than is possible in any other way.

In wet process kilns, the insulation is generally omitted from the upper 15 to 20 ft. at the coal end. The linings of wet process kilns absorb considerable moisture from the slurry and it is generally preferable to install solid fire brick linings in that section to prevent saturation of the insulation. The balance of the kiln exclusive of the burning zone should be insulated in the same manner as described for dry process kilns.

Waste Heat Equipment

Where waste heat is utilized it is important to insulate the entire system, including kilns, settling chambers, waste heat flues and the boilers. The settling chambers should be insulated with 4½ in. of Sil-O-Cel brick between the fire brick lining and the concrete in the side walls. The top should be insulated with two 2½-in. layers of insulating brick and the base with 4 in. of Sil-O-Cel C-3 concrete. C-3 Sil-O-Cel is a calcined granular form of Sil-O-Cel which is mixed with portland cement and poured into place the same as ordinary concrete. The use of this material in the base effectively prevents the waste of heat into the ground. (Sil-O-Cel C-3 concrete is also used by many plants in making shut-off dampers in waste heat systems.)

Waste heat flues and the settings of the boilers should be insulated with 4½ in. of insulating brick and the tops of the boilers with two 2½-in. courses of insulating brick. By insulating kilns the temperature of the exit gases has been increased as much as 200 deg. F. and it is important to conserve as much of this heat as possible up to the point where it is utilized in the boilers.

In the new plant of the Southwestern Portland Cement Co. near Dayton, Ohio, Sil-O-Cel insulating materials are being used in kilns, kiln hoods, settling chambers, equalizer and connecting flues, waste heat boilers and economizers, clinker pits and coolers, and coal dryers. This company is entirely familiar with the benefits of thorough insulation as this means of conserving fuel has been employed by them for a period of about five years at their plants at Victorville, Calif., and El Paso, Texas.

Ironton Plant of Alpha Portland Cement Company Has Perfect Safety Record for March

UNDER action taken by the safety committee of the Alpha Portland Cement Co., Easton, Penn., all employes in the mill and mine at Ironton, Ohio, are required to wear heavy goggles, while working. A number of eye injuries have resulted at the plant in recent years in which they could have been prevented through the wearing of the glasses.

A gold flag of the Alpha Portland Cement Co. was awarded the Ironton plant for the month of March. The flag is given to the plant where no accidents occur during thirty actual working days. Quite a number of safety devices have been installed at the Ironton plant.—*Ironton (Ohio) Irontonia.*

New Coal-Feeding Device and Special Furnace for Shaft Lime Kilns

St. Genevieve Lime and Stone Company Building Kilns with Some Novel Features

ST. GENEVIEVE, Mo., is the scene of considerable activity in the lime industry at present. Among recent developments there are some improvements at the plant of the St. Genevieve Lime and Stone Co. of general interest because they are evidence of the constant effort being made to understand and improve the operation of shaft kilns.

The accompanying sketch and views give a general idea of the special features of a new kiln furnace designed and patented by W. Ward of the St. Genevieve company. The patent covers the construction of a furnace with air circulation over and around the combination chamber for the two-fold purpose of cooling the furnace lining and preheating the air for combustion. The air after circulating through channels between the inside and outside arches of the furnace is freed from a duct under the grates. A steam injector in the side wall of the furnace promotes the circulation of the air and gives an intimate mixture of preheated air and steam under the grates.

Automatic Stoker or Coal Feeder

The machine for feeding the coal into the furnace consists of a hopper arrangement with a rotating cylinder underneath. The cylinder revolves very slowly, dropping the coal into a spreading device designed to insure a uniform flow of coal over the fire bed. All air inlets other than those described are practically sealed to insure a uniform draft of preheated air in the furnaces.

Several stokers have been installed on kilns at the plant of the St. Genevieve Lime & Stone Co. The kilns are 18 ft. in diameter outside, and inside are 5 ft. x 10 ft. Fuel efficiencies ranging from 4 lb. of lime to a pound of coal up to 5 lb. to the pound of coal have been secured.

One of the accompanying views shows a feeder installed alongside a kiln, serving a gas producer. The same type of feeder is built right into the wall of a kiln which has no gas producer, but an ordinary furnace, and good efficiency has been secured on this kiln—5 lb. of lime to 1 lb. of coal.

The advantages claimed for this device, in addition to the increase in fuel efficiency, is an appreciable increase in the possible capacity of the kiln. Combustion with this type of furnace, it is claimed, takes place, not in the furnace but in the kiln. Temperature ranges are from 1500-2000 deg. F. in the furnace, and from 2400-2700 deg. F. in the kilns, whereas the reverse is said to be true in the old type of kiln.

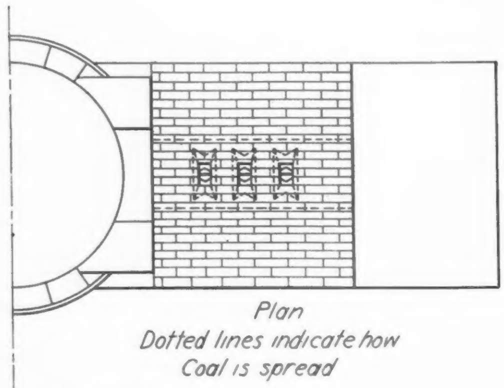
In other words, it is claimed that by thus feeding the coal in a steady stream of fine material over the fire bed, the combustion really takes place before the coal becomes a part of the more or less consolidated fuel

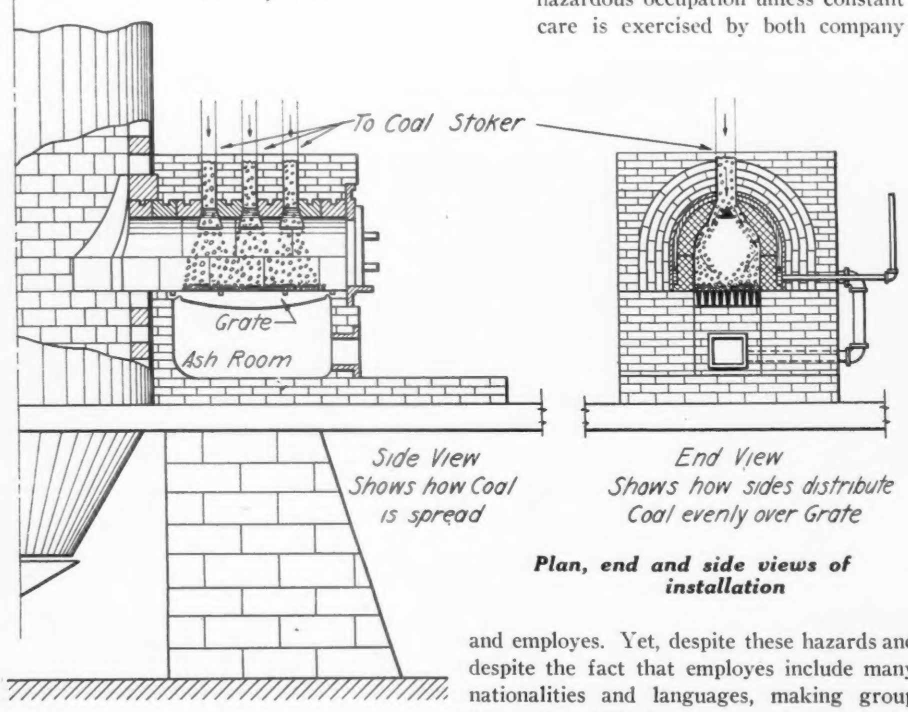
Left—The feeder consists of a hopper with a slowly revolving cylinder underneath. Right—The feeder installed alongside a kiln feeding a gas producer

bed. There is, of course, the additional advantage that air supply to the furnace is under complete control, as well as the amount of fuel fed to the furnace.

Furnace Construction Details

In building the furnace the fire brick arch is first set up with the air channels made through spacing of the brick. The arch ring is then covered with sheets of asbestos paper, closing the air channels and permitting the outer arch rings to be built. The purpose of the asbestos paper is to keep mortar and other debris out of the air channels during construction. It is claimed the inner arch lining of the furnace may be readily replaced without disturbing the furnace construction proper. The outside arches, of course, carry the kiln lining, so that in replacing the furnace lining the kiln lining is not disturbed.





Plan, end and side views of installation

It is proposed soon to put this type of furnace and stoker on the market.

[In connection with the above the reader will be interested in Mr. Azbe's article on page 38 of this issue in which he discusses the effect of various methods of firing.—Ed.]

Universal Cement Has Perfect Safety Record for April

A PERFECT record for industrial safety was achieved in April by the Universal Portland Cement Co., according to an official report. All its mills, located in various sections of the country, operated during April without having a single employe lose any time on account of accidents.

"With thousands of workers employed, manufacturing over 5,000,000 sacks of cement last month and with operations speeded up to meet the heavy demands of spring construction without the occurrence of any accident, is a gratifying result of years of safety education," declared B. F. Affleck, president of the company.

"Cement manufacture, in common with many other industries, is a hazardous occupation unless constant care is exercised by both company and employes. Yet, despite these hazards and despite the fact that employes include many nationalities and languages, making group instruction difficult, the use of modern industrial safeguards to protect the health and life of workers and the constant safety education that has been conducted for 25 years, have resulted in the 100% perfect record established last month.

"The month of May marks the 25th anniversary of the organization of the Universal Portland Cement Co.," concluded Mr. Affleck. "We believe there is no feature of this 'birthday' observance more gratifying than the ability publicly to announce this record of safety in the industry."

Governor Would Build Roads with Surplus from South Dakota Cement Plant

BEGINNING next autumn a system of hard surfaced roads may be constructed in South Dakota by the labor of convicts with the surplus product of the state cement plant, according to a plan announced in Mitchell, S. D., by Governor Carl Gunderson. Only lack of necessary legal authority would defer the inauguration of the plan, according to the governor. He believes, however, that the state administration already possesses the necessary power to put the scheme into operation.

"Under the plan," said the governor, "the cement would cost the state a comparatively trifling sum. We would operate the state cement plant at capacity and the surplus over and above our orders would be employed on these state roads.

"As it is now the inmates of the penitentiary have only their work in the twine plant. I believe it is more wholesome for them to be occupied. And in addition I would pay them a small sum for their work, the amount to be turned over to their dependents.

"If I find I am prohibited by lack of legal authority from carrying out the plan at once, I shall ask the legislature for the necessary law at the earliest opportunity."—*Omaha (Neb.) World Herald.*

New Topographic Maps of Pennsylvania and West Virginia Areas

FOUR new topographic maps, covering areas in West Virginia and Pennsylvania have been issued by the Department of the Interior through the Geological Survey. The West Virginia maps represent the White Surphur Springs and Hanging Rock quadrangles and the Pennsylvania maps the Milton and the Williamsport quadrangles. They are published on the scale of 1 mile to 1 in. and printed in four colors. The layman frequently says that he is unable to read the Geological Survey's topographic maps or to see on them the ups and downs of the country as portrayed by the contour lines. In these maps this criticism is overcome by the addition of a light shading in another color, which gives the map the effect of a model. The shading, however, does not obscure the contours, which to the experienced eye show the shape of every natural feature of the area, as well as its altitudes above sea level. Each map is really a dictionary of altitudes.

These four maps are part of the great topographic atlas of the United States that the Geological Survey is making, which is recognized as providing a basic, general purpose map of the country. In areas that the Geological Survey has mapped the engineer, whatever may be his project, has no need for trial or preliminary surveys. The topographic map serves his purpose and can be obtained from the Geological Survey at the nominal price of 10 cents, although the cost of making such a map is from $6000 to $8000.

Sand and Gravel Dredge With 18-in. Pump

Dredge "W. T. Rossiter" of M. A. Callahan Sand and Gravel Co. Represents the Greatest Advance in Dredges of Its Type

M. A. CALLAHAN, head of the M. A. Callahan Sand and Gravel Co., has been engaged in producing sand and gravel at plants near Cleveland, Ohio, for a good many years. "Callahan, the Sand Man," has been a familiar name to the people of Cleveland. Since he began, four sons have grown to man's estate and joined him in the formation of the present company which operates two plants about 30 miles out of Cleveland and one in Pennsylvania.

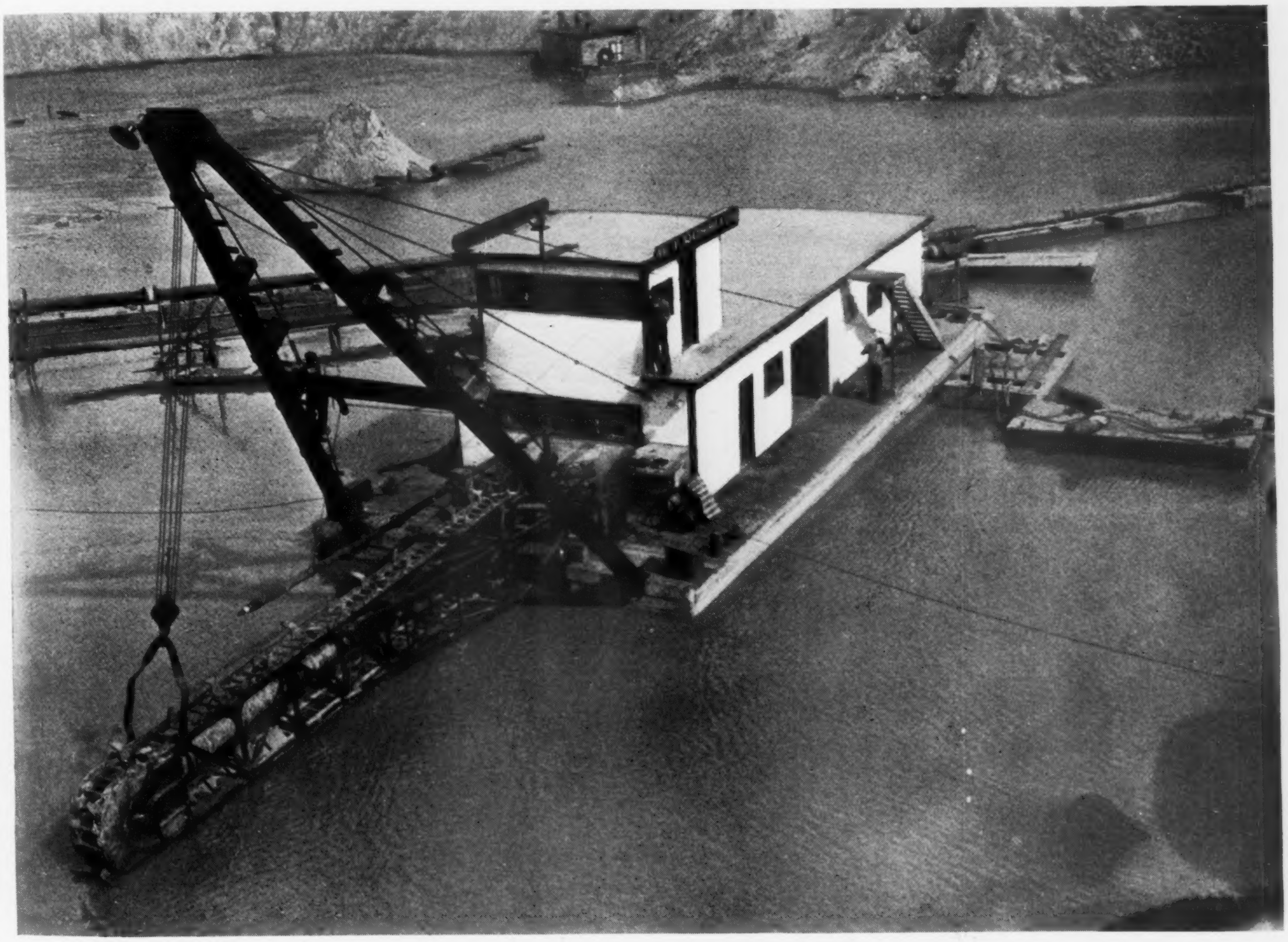
The operations near Cleveland are conducted with dredges. The deposit is not only of great extent but the sand and gravel are of considerable depth. Part of this depth is a high bank above water level and part is below water level. The deposit is worked by a combination of hydraulicking and sluicing, the bank being broken down by a stream from a sluicing nozzle and the sand lifted, along with the sand that comes from below water level, by the suction of the dredge.

In this work the company has built three dredges. The first of these, a 10-in. dredge, has no name expect that it is spoken of as "the old dredge." It is an able veteran and still ready for service whenever the peak of production demands it. The second dredge is *Mark Anthony*, a 12-in. pump dredge of more modern design, which is working every day. The third dredge just going into service as this is written is the *Wm. T. Rossiter* (named for one of the vice-presidents of the Cleveland Builders Supply Co.), which has an 18-in. pump.

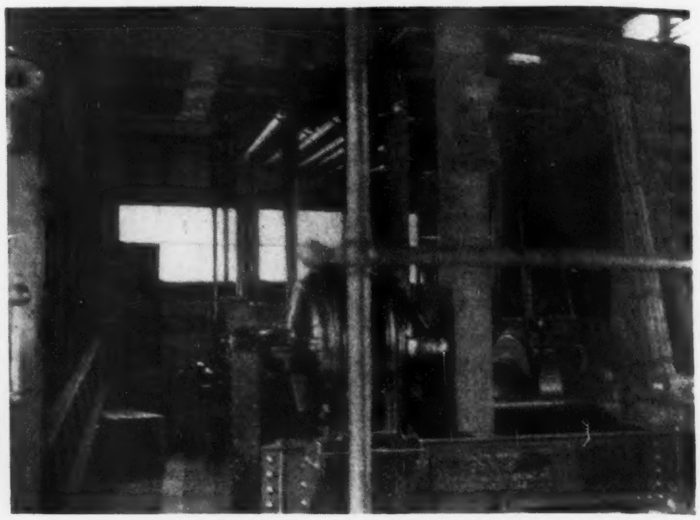
Of its type, a "straight" sand and gravel dredge, the *Rossiter* is the largest of which Rock Products has knowledge, and it is surpassed in size and capacity only by such dredges as the *Sandcraft* (described in Rock Products for February 7) and some few others of the sea-going hopper type.

The hull is of wood, about 70 ft. long. It is built of carefully selected timber, all the keelsons, gunwales and other main timbers being one-piece sticks of Pacific coast fir. On this is erected a cabin above which rises a house like the pilot house of a steamboat in which are the dredge controls. All the construction is of the best, timbers being protected with paint and creosote wherever needed, the sides of the cabin sheathed and the decks covered with canvas.

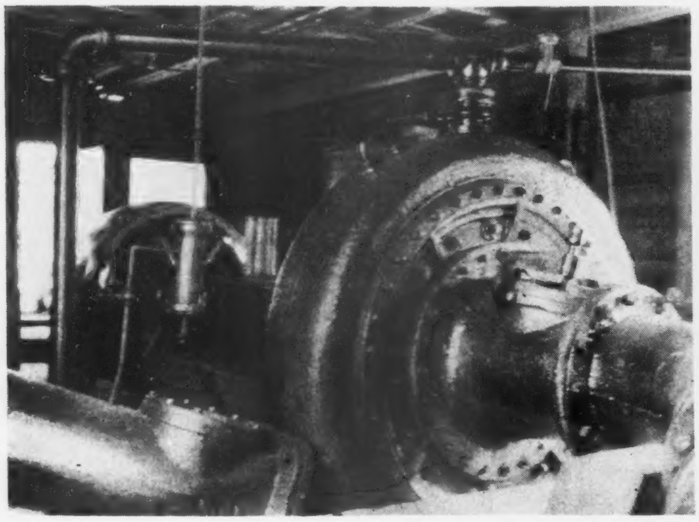
In the cabin, set on the center line of the hull, is the 18-in. pump and the direct-connected motor. The pump was made by the

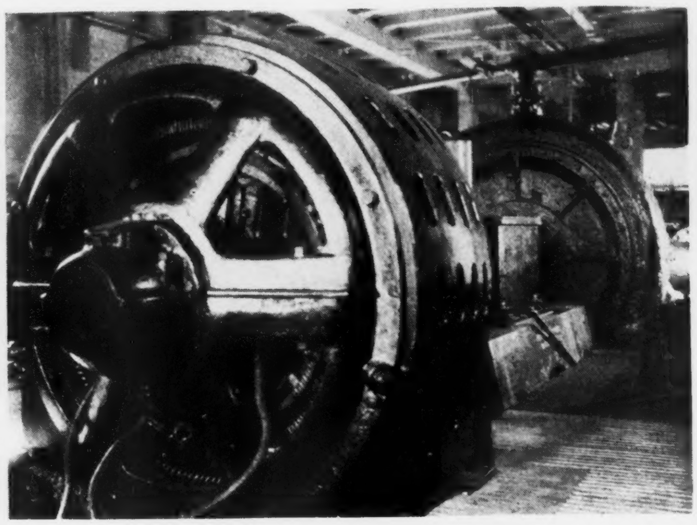


The dredge "W. T. Rossiter" as seen from the bank above. Note the pipe for hydraulicking above the suction ladder

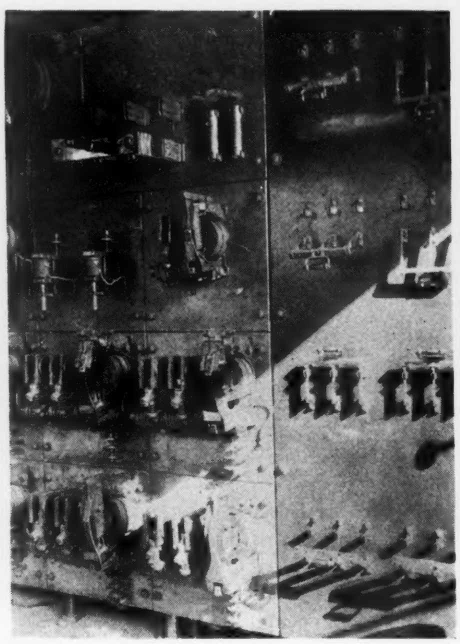


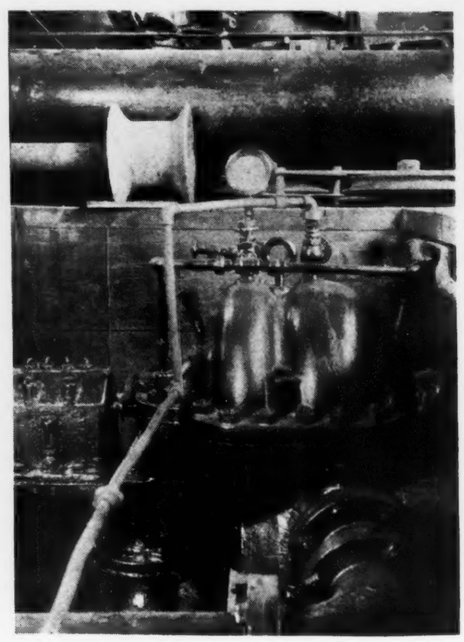
Left—Bow of the "Rossiter" showing the traveling suction screen, said to be the largest yet built. Right—The 6-drum hoist by which the dredge is handled





Left—Suction end of the 18-in. pump. Note distance between it and motor, occupied by the thrust bearing. Right—The 400-h.p. direct-connected variable speed motor





Left—Norman Callihan standing beside the big pump. Center—The switch board with alterating current contactors. Right—The double stage pump for hydraulicking

Morris Machine Works, Baldwinsville, N. Y. It is of a new type recently developed by this company for dredging, with a high-carbon steel body and manganese steel runner and lining plates. The runner is of a special design. The thrust bearing is very long and of the marine type.

The motor which drives it is rated at 400 h.p. It was made by the General Electric Co. and is of the slip-ring variable-speed type using 3-phase, 60 cycles, 440 volt current.

The pump is "underslung;" that is, the discharge pipe is at the bottom instead of at the top, this permitting the discharge to lead straight away from the pump into the pontoon line to the washing plant on the shore.

The suction leads out from the pump with a long radius S curve, made of special steel to resist wear. This curve is necessary to accommodate the design to the traveling suction screen which has been added to the dredge since it was built. The traveling suction screen is said to be the largest ever made and it was designed and built by W. H. K. Bennett of Chicago.

For sluicing down the sand from the bank there is a 5-in. De Leval pump driven by a 50 h.p. squirrel-cage General Electric motor. This pump is of the two-stage type; that is, one centrifugal pump discharging through a second pump, which raises the velocity. This gives a very powerful stream to cut into the bank and wash it away.

The discharge from this pump passes under the deck to the bow of the dredge and into the pipe and nozzle, which is directed against the bank. This nozzle may be seen in the picture of the bow of the dredge just above the suction and traveling screen.

In addition to these working pumps there are two Morris centrifugal bilge pumps each connected to a 5 h.p. General Electric motor. These are to keep the hull free from any water that may get into it either by leakage or otherwise. These pumps may also be employed in washing down the decks.

For swinging the dredge, handling the suction and the like there is a six-drum hoist made by the Marion Steam Shovel Works. This is powered by a 50 h.p. General Electric motor. The controls are led to a set of levers in the house above.

There is a bank of these levers in front of which the operator stands. Behind him is the switchboard divided into two panels. One of these contains eight alternating current contactors and a master switch. When this is thrown in and the lever which controls the speed of the big pump motor is advanced, the alternating current contactors are thrown in one after another automatically, thus increasing the speed. The resistances that go with this system are behind the switch board in a separate room.

The other panel contains the switches for starting and stopping the motors on the hoist, the sluicing pump and the bilge pumps. It also contains a special switch for testing the switch board so that it may be seen that everything is in order before the day's work is begun. When this switch is thrown in the contactors will throw in automatically one after the other as the lever is advanced but without starting the pump motor.

The pump discharge passes through a pontoon line to the shore plant which is known

Left—The 18-in. pipe brings the pump discharge to this (Earlville) plant. Right—Cars being loaded at Earlville plant

Left—This shows the great depth of the deposit, from the top of the bank to far below the water line. Right—The "Mark Anthony" in action using both pump and sluicing nozzle

as the Earlville plant. This is a very simple form of washing plant as it produces only sand for regular shipment. The gravel is in small percentage and it is stored and then sold for road building purposes from the storage pile.

The pipe discharges into a long sluice extending all the way over the bins. In the bottom of the sluice are pockets, or traps. These have a screen above and a sliding gate underneath. By setting these gates to the right opening the sand is discharged without much water accompanying it. The screens used vary in size, the opening having some influence on the settling of the sand as well as the size of grain that settles. There is a certain amount of classification in these sluices so that the product may be varied. The bins discharge into railway cars through the usual spouts and segmental gates.

The other plant of the company at this deposit is known as the Hugo plant. It sits high on the bank above the pond and for this reason the plant has been built to use as little height as possible in order to save the pump the work of elevating.

There are two bins at this plant each 30x50 ft. and 15 ft. deep. One of these is filled while the other is being unloaded into cars by a Link Belt locomotive crane with a Lakewood 1-yd. bucket, steam powered. As in the Earlville plant, there is a sand sluice with traps protected by screens and closed by sliding gates. The sand flows from these traps across the bins and only clayey water is discharged at the overflow of the bins on the other side. An American 50-ton steam locomotive and four 12-ton Western side dump cars form part of the equipment. With these gravel and sand are hauled to the Earlville plant, where they are placed in stock piles.

As these plants are rather remote from any good sized town, most of the employes live at the plant. M. A. Callahan and Norman Callahn have summer homes there and others who are employed by the company have built pretty cottages on the margin of Stewart's lake which is near the plant.

The entire output of all the plants is sold to the Cleveland Builders Supply Co. of Cleveland, Ohio. It is about 200 cars per day. A second dredging operation is conducted near Willow, Ohio.

The company has its offices in the Schofield building in Cleveland. M. A. Callahan is president; Norman Callahan is vice-president and general manager; Nelson Callahan is treasurer; David G. Callahan is secretary, and Clifford Callahan is superintendent of the plant in Pennsylvania. William Adrion is dredgemaster and generally superintends the work at the Earlsville plant.

Left—Hugo plant showing collecting boxes which are unloaded by the crane. Right—Sand sluices at Hugo plant

Wm. Adrion, dredgemaster of the "Rossiter"

Screens in sand sluices

M. A. Callahan, president of the company

National Lime Association Convention

An Interesting and Instructive Program — All Lime Manufacturers Invited to Open Meetings

THE program of the seventh annual convention of the National Lime Association bids fair to establish this convention as an epoch-making one in the history of the lime industry.

Efforts are being made to start an exhibit of machinery and equipment in connection with this and future conventions, which, if successful, will add much to the educational and practical value of the meetings.

The convention is to be held at Briarcliff Lodge, Briarcliffe Manor, Westchester county, N. Y.

PROGRAM

Tuesday, May 26, 1925

A. M.

10:00 Meeting of Board of Directors.

11:30 Executive Session of Membership. Association Affairs. Appointment of Committees.

P. M.

1:30 Luncheon and Address—"Lime in Dirt Roads," Dean E. J. McCaustland, University of Missouri.

2:30 Preliminaries—Golf Tourney.

8:00 Second Annual Research Conference. (A round table meeting of lime technical men, plant chemists, superintendents and manufacturers.)

Wednesday, May 27, 1925

Open Session

A. M.

10:00 Opening Address—George B. Wood, president, N. L. A.

10:15 Report of the General Manager—Burton A. Ford, general manager, N. L. A.

10:30 Address—"Developments in the Lime Treatment of Trade Wastes," E. B. Besselievre, Sanitary Engineer, The Dorr Company, New York City.

Executive Session

A. M.

11:00 Status of Lime Plaster Investigation, G. J. Fink, Chemical Director, N. L. A.; J. E. Underwood, Assistant Chemical Director, N. L. A.

11:30 Report of Plaster Committee; George B. Wood, Chairman.

12:00 Status of Lime Building Block Investigation; J. W. Stockett, Assistant Chemical Engineer, N. L. A.

12:15 Report of Lime Block Committee; Charles Warner, Chairman.

P. M.

1:00 Luncheon and Address—"Association Literature," Miss E. H. Roth, Sheboygan Lime Works, Sheboygan, Wis.

2:00 Continuation—Golf Tourney. Preliminaries—Tennis Tourney. Preliminaries—Quoit Tourney.

8:30 Auction Bridge Party. Swimming Party.

Thursday, May 28, 1925

Open Session

A. M.

10:00 Report of Chemical Activities, G. J. Fink, Chemical Director, N. L. A.

George B. Wood, President, National Lime Association

10:15 Address—"Kiln Performance," Victor J. Azbe, Combustion Engineer, St. Louis, Mo.

Executive Session

11:15 Reports of Committee and action by Membership.

P. M.

12:30 Luncheon and Remarks—Chas. M. Cadman, President, Pacific Lime and Plaster Company, San Francisco, California.

1:30 Finals—Golf Tourney. Finals—Tennis Tourney. Finals—Quoit Tourney.

4:00 Baseball Game.

7:30 Dinner and Entertainment—Awarding of Prizes (The Valve Bag Company of America will be host).

Friday, May 29, 1925

Open Session

A. M.

10:00 Report of Agricultural Activities, R. C. Towles, Soil Technologist, N. L. A.

10:15 Report of Construction Activities, R. P. Brown, Construction Engineer, N. L. A.

10:30 Address—"Advantages of Lime in Water Purification and Softening," (Illustrated and Demonstrated) C. P. Hoover, Chemist, Water Purification Plant, Columbus, Ohio.

10:50 Address—"Lime in Asphalt," Prevost Hubbard, Chemical Engineer, The Asphalt Association.

11:15 Adress—Henry M. Camp, Eastern Division Manager, N. L. A.

11:30 Address—G. B. Arthur, Central Division Manager, N. L. A.

P. M.

12:00 Meeting New Board of Directors.

Adjournment

New Batesville Lime Plant Operating

THE new plant of the Batesville White Lime Co. at Limedale, Ark., which has been under construction for about a year and a description of which appeared in the February 7 issue of ROCK PRODUCTS, is now in operation, using all three kilns.

The quarry is located near Bethesda, about two miles from the plant, and is connected with the plant by a narrow-gage railroad, completed recently.

The plant was built at a cost of \$250,000 and will produce 600 tons of lime products daily.

Correction

RECORDS are made, it is true, but the one attributed to a blast made by the Dittlinger Lime Co., New Braunfels, Texas, in the May 2 issue of ROCK PRODUCTS was beyond all reason in spite of the fact that the information came from the office of one of the leading powder companies. The holes were loaded and fired in three and a half hours, but the drilling had, of course, been done previously and not in three and a half hours. Also 97,286 tons, not pounds, of rock were prepared by the blast.

Magnesia-Portland Cement*

German Expert Proves Satisfactory Portland Cement Can be Made with a Content of 8% Magnesia

By Dr. K. Balthasar

IN SPITE OF numerous investigations by men prominent in cement research, the part played by magnesia in portland cement has not as yet received satisfactory explanation.

The manufacturer evades this problem by avoiding the use of highly magnesian rock. However, there are cement plants which have no other material at their disposal than rock with a relatively high magnesia content. The product of such plants is generally in bad repute. It is notable, however, that these magnesia portland cements are sometimes equivalent to the best portland cements, yet soon assume inferior properties.

The purpose of the following discussion is to furnish the needed explanation and to make it possible to permanently maintain the good qualities of magnesia portland cement.

The author had the opportunity to work in a plant where the portland cement manufactured contained an average of 8.0% magnesia. To retain the selling value of a portland cement with such a high magnesia content, considerable deviations from the standard process of manufacture become necessary.

The mechanical treatment of raw materials and clinker remains the same, though changes are introduced in the composition of the raw mix and in the calcination process.

The composition of the raw mix is based on a hydraulic index of 2.10. It may be added here that the hydraulic index takes into account only the ratio $\frac{CaO}{SiO_2 + R_2O_3}$. The magnesia content should not be considered in determining this ratio.

Control of Raw Mix

A constant supervision of the raw mix is based on a determination of its carbon dioxide content. Two methods are in use for this purpose. One is a direct volumetric determination of carbon dioxide in the calcimeter; the other is a quantitative analysis with normal hydrochloric acid. Both methods yield the same results and are assumed to be familiar in the following text:

As a rule from the carbon dioxide content, thus determined, the calcium carbonate content is computed.

*Translated from the German (*Tonindustrie-Zeitung* No. 19, March 7, 1925) by Margaret G. Arronet.

In dealing with a raw mix free from magnesia the desired hydraulic index 2.10 is reached by bringing the proportion of $CaCO_3$ in the raw mix to 76.6%. Though small quantities of magnesium carbonate may affect somewhat the accuracy of this determination, it is not customary to take this into account.

However, when a larger amount of magnesium carbonate is present and the proportion of $CaCO_3$ is fixed at 76.6%, the best of conditions will produce a completely deteriorated clinker devoid of setting properties.

The determination of the proportions of the raw mix having a hydraulic index of 2.10 in the presence of high magnesia content shall be illustrated by an example.

Assume that a dolomitic limestone and a marl* of the composition given below are the available materials.

Dolomitic Limestone

$$79.37\%\ CaCO_3 = 44.447\ CaO + 34.923\ CO_2$$
$$17.63\%\ MgCO_3$$
$$2.60\%\ SiO_2 + R_2O_3$$
$$0.40\%\ H_2O$$
$$100.00\%$$

Marl

$$54.02\%\ CaCO_3 = 30.251\ CaO + 23.769\ CO_2$$
$$1.60\%\ MgCO_3$$
$$38.53\%\ SiO_2 + R_2O_3$$
$$5.85\%\ H_2O$$
$$100.00\%$$

In order to produce a mix with a hydraulic index of 2.10, these two rocks should be combined in a very definite proportion. The condition implied by the correct mixing proportions requires that the total lime content divided by the total silica content should be equal to 2:10, which permits a computation of the mixing proportions.

The term "mixing proportions" designates here the weight of limestone to be combined with a unit weight of marl.

Denoting the mixing proportion by m, the lime content of the limestone by $(CaO)K$, the lime content of marl by $(CaO)M$, the silica content of the limestone by $(SiO_2 + R_2O_3)R$ and the silica content of marl by $(SiO_2 + R_2O_3)M$, the following relation is true for these constituents in accordance with our assumption:

*Note by the translator: the term *marl* (Mergel) is evidently used in a slightly different sense from that customary in the U. S. A.

$$\frac{m\,(CaO)K + (CaO)M}{m\,(SiO_2 + R_2O_3)K + (SiO_2 + R_2O_3)M} = 2.10 \qquad (1)$$

Substituting values obtained in the analysis, we have:

$$\frac{44.447m + 30.251}{2.6m + 38.53} = 2.10$$
$$38.987m = 50.662$$
$$m = 1.3$$

Therefore, in order to obtain with the given materials a mix with a hydraulic index of 2.10, 1.3 parts by weight of limestone should be combined with 1 part by weight of marl.

Making 1 part by weight = 100 kg., the correct mix will be produced by simultaneous weighing of 130 kg. limestone for each 100 kg. marl. The mixture of 230 kg. thus obtained shows the following proportions of chemical constituents (by weight):

$$79.37 \times 1.3 + 54.02 = 157.201\ CaCO_3$$
$$17.63 \times 1.3 + 1.60 = 24.519\ MgCo_3$$
$$2.60 \times 1.3 + 38.53 = 41.910\ SiO_2 + R_2O_3$$
$$0.40 \times 1.3 + 5.85 = 6.370\ H_2O$$
$$130.00 + 100.00 = 230.00$$

The analysis of this raw mix yields the following values:

$$68.35\%\ CaCO_3 = 38.276\ CaO + 30.074\ CO_2$$
$$10.66\%\ MgCO_3 = 5{,}076\ MgO + 5.584\ CO_2$$
$$18.22\%\ SiO_2 + R_2O_3 \qquad 35.658\ CO_2$$
$$2.77\%\ H_2O$$
$$100.00\%$$

The raw mix thus obtained has a hydraulic index of 2.10 as assumed:

$$\frac{CaO}{SiO_2 + R_2O_3} = \frac{38.276}{18.22} = 2.10$$

The carbon dioxide content is equal to 35.658 CO_2. Computing from this the amount of calcium carbonate:

$$CaCO_3 = \frac{CO_2}{0.44} = \frac{35.658}{0.44} = 81.04\%$$

The given standard mix has an apparent content of 81.04% $CaCO_3$, which should be the average value of hourly control tests.

Determination of CO_2

With reference to determination by means of a calcimeter it may be noted here that the emanation of carbon dioxide proceeds rapidly only at the outset of the reaction. The flow of gas to the measuring tube becomes slower and may be considered as completed only after 10 minutes. The calcimeter should be carefully protected from all tem-

perature changes during this period. The temperature recorded by the thermometer on the apparatus at the beginning and upon completion of the gas evolution should be noted. A difference of 0.5 deg. C. is sufficient to make the determination worthless. Corrections for errors are useless, as it is impossible to determine whether the entire mass of gas has undergone the observed change in temperature.

In spite of this difficulty, the calcimeter remains a very useful measuring device in this investigation. A trained chemist is able to draw conclusions from the nature of gas evolution concerning the amount of magnesia present. Each determination of CO_2 content brings about an approximate determination of magnesia.

Quantitative analysis yields results of greater accuracy, as this method is not influenced by temperature changes. Although it does not permit a determination of magnesium carbonate present, it makes it possible to make a rapid determination of the calicum content from the neutral solution of calcium and magnesium chloride. The $CaCl_2$ is treated with oxalic acid and the excess acid is titrated with a potassium permanganate solution. Determinations of this nature are obtained with sufficient accuracy within 15 to 20 minutes.

The quantity of oxalic acid corresponds to the quantity of calcium oxalate and, accordingly, to the originally present quantity of calcium carbonate. From these two quantitative determinations the quantity of magnesium carbonate may be computed.

The standard raw mix of the above example yields:

	%
Hydrochlric acid determination	81.04
Oxalic acid determination	68.35
Difference	12.69

The difference between these two values is that quantity of $CaCO_3$, which is equivalent to the quantity of $MgCO_3$ present. As 1.00 $CaCO_3$ = 0.84 $MgCO_3$, the raw mix contains:

$$12.69 \times 0.84 = 10.66\% \ MgCO_3$$

The ratio of magnesium carbonate to calcium carbonate is of utmost significance for the average value of mixing proportions. If it varies, this average value should be varied accordingly.

The ratio: $\left(\dfrac{CaCO_3 + MgCO_3}{CaCO_3}\right)$ in the raw mix is designated as "dolomitic index." The values of $(CaCO_3+MgCO_3)$ result from the determination of total CO_2 content, from which the total calcium carbonate is computed, constituting the customary hourly control test. The $CaCO_3$ denotes the actual percentage of calcium carbonate as obtained by treatment with oxalic acid. In the standard mix described above the dolomitic index is:

$$\frac{81.04}{68.35} = 1.186$$

If the composition of the standard mix varies within 1% from the average (as frequently encountered in the mechanical procedure) the dolomitic index remains the same. Its value changes only when the ratio of $MgCO_3$ to $CaCO_3$ is changed in the raw mix. As such changes are met with at times, it is necessary that at least once a day a check be made on the dolomitic index. Variations of 1.170 to 1.200 are permissible. However, should the dolomitic index assume higher or lower values, a new determination should be made of the average proportions based of a new analysis of the mix.

From the foregoing it is clear that the average value of the hourly control tests is definitely fixed by the hydraulic index and by the total $MgCO_3$ content of the mix.

In dolomitic marls it is frequently encountered that magnesia is present not only as carbonate, but also in the form of magneisum silicate. Aside from this, such marls frequently contain alkalis and sulphuric anhydride. The effect of these compounds on the proportions is inappreciable, as shown below. Second example:

Limestone

96.84% $CaCO_3$ = 54.23 CaO + 42.61 CO_2
1.35% $MgCO_3$
1.51% SiO_2 + R_2O_3
0.30% H_2O

100.00%

Dolomitic Marl

32.75% $CaCO_3$ = 18.45 CaO + 14.30 CO_2
20.32% $MgCO_3$
37.06% SiO + R_2O_3
3.03% MgO
0.53% alkalis
1.26% SO_3
5.05% H_2 %

100.00%

A raw mix with hydraulic index of 2.10 is required. What should be the average proportions of a standard mix for these materials?

According to Formula 1, we have

$$\frac{54.23m + 18.45}{1.51m + 37.06} = 2.10$$

$$m = 1.165$$

96.84 × 1.165 +	32.75 =	147.57 $CaCO_3$
1.35 × 1.165 +	20.32 =	21.89 $MgCO_3$
1.51 × 1.165 +	37.06 =	38.82 SiO_2 + R_2O_3
0.30 × 1.165 +	5.05 =	5.40 H_2O
	3.03 =	3.03 MgO
	0.53 =	0.53 alkalis
	1.26 =	1.26 SO_3
116.5	+ 100.00 =	216.5

Raw Mix

67.24% $CaCO_3$ = 37.65 CaO + 29.50 CO_2
10.11% $MgCO_3$ = 4.81 MgO + 5.30 CO_2

17.93% SiO_2 + R_2O_3 34.89 CO_2
1.40% MgO
0.25% alkalis
0.58% SO_3
2.49% H_2O

100.00%

The CO_2 content of the raw mix corresponds to an average proportion of $\dfrac{34.89}{0.44}$

$$\frac{34.89}{0.44}$$

$$(CaCO_3 + MgCO_3) = 79.30\%$$

The hydraulic index of 2.10 corresponds to a dolomitic index of 1.179.

Although the dolomitic indices are approximately the same in the two examples discussed, the proportions of 81.04 and 79.3 differ considerably.

Analysis of Magnesia Portland Cement (Clinker)

	%
MgO	9.42
CaO	60.80
SiO_2	18.22
Al_2O_3	7.15
Fe_2O_3	3.58
Alkalis	0.83
Total	100.00

In standard portland cement the alumina present in the raw mix may contain constituents which affect the fixed mixing proportions. As the chemical composition of alumina has been proven to undergo no changes, a definite value may be maintained as long as the same materials are used. It is sufficient to make a complete analysis from time to time of the raw mix.

The same applies to the alumina content of magnesia portland cement as for standard portland; it, therefore, requires no special checking.

Of equal importance as the composition of the raw mix is proper calcination. Calcination also shows considerable deviations from the standard process.

In dealing with magnesia portland cement clinker formation does not denote the last stage in calcination. This cement is proуced only when the clinker is given the chance to remain for some time in a fused molten state.

Stages in Calcination of Magnesia Portland Cements

The following stages are noted in the course of calcination of these cements:

Stage 1: Drying of the raw mix with elimination of mechanically added water, followed by elimination of carbon dioxide and of the chemically combined water. The product of this stage appears as a yellow, easily crumbling mass, which, when ground, gives a yellow powder whose properties are similar to those of a good Roman cement.

Stage 2: The mass, with water and acid completely eliminated, cakes and forms a chocolate brown clinker. The product of this stage is a hard clinker with a specific gravity of 2.8 to 3.0, which crumbles in a few days when exposed to air. Grinding of this clinker yields an olive green powder possessing no hydraulic properties. When made into test pats it shows no setting even after days of curing in the laboratory.

Stage 3: The chocolate brown clinker

acquires a bluish black coloring. This clinker has a specific gravity of 3.1, crumbles only to a relatively small extent after long periods of storage and, when ground, yields a cement of standard portland cement coloring. Pats made from this cement show pronounced unsoundness.

Stage 4: The clinker is kept in the sintering zone for some time with strongest calcination. It retains the bluish black coloring and shows no other apparent changes. Pats made from ground clinker are slow setting even without gypsum admixtures. When removed from the glass plate after 24 hours they show a mirrorlike smooth bottom surface; the top surface appears greyish white, shining and glazed. The boiling and drying tests are passed satisfactorily.

Shaft Kilns Necessary

The fourth stage requires a vertical kiln with calcination procedure as follows: 13% fine blast furnace coke is pressed in the briquets in charging and each layer of briquets is alternated with a layer of 10% coarse blast furnace coke. A kiln with 2.5 m. inside diameter permits layers of 300 briquets each. The time of calcination is taken as twice that of ordinary portland cement.

No experimental data are available for the rotary kiln.

No reliable data can be obtained in small laboratory furnaces, as the required conditions of calcination cannot be maintained.

The properly manufactured magnesia portland cement shows the following average properties as observed by the author:

Color: Light grey.
Specific gravity: 3.1.
Weight per liter: Loose 1250 gm.; compacted 1900 gm.
Fineness: 0% residue on 900-mesh sieve, 12% on 2500-mesh sieve, 22% on 4900-mesh sieve.
Time of setting: Initial—8 hours.
Final—12 hours.
Quantity of mixing water for normal consistency: 26%.
Temperature of air and mixing water: 18 deg. C.
Rise in temperature during setting: 2 deg. C.
Constancy of volume:
Pats cured in water } OK
Pats cured in air } OK
Boiling and drying test } OK

Strength of 1:3 mortar:

	kg. per sq. cm. 3 days	7 days	28 days
Tension	18	27	32
Compression	160	250	300

The problem whether during hardening magnesia acts as an independent cementing material or has a more or less appreciable effect on this process remains open to investigation.

At any rate, magnesia portland cement is a cement which, for all purposes, is equivalent to ordinary portland cement.

Dixie Portland Cement Co. Holds Safety Celebration

IN the ball park at Richard City, Tenn., on April 13 there was held the largest safety event ever staged at the Dixie Portland Cement Co.'s plant.

A contest was started on January 1, the entire crew being divided equally into two safety organizations, known as the Clinkers and Lime Rocks. The organization having the greater number of time lost accidents was to supply a feed for the entire crew, their wives and families; if neither had a time lost accident, the feed was to be provided by the company. This contest aroused a great deal of interest and both sides came through with perfect records, leaving the company to provide the feed.

It was necessary to put on the feed in the form of a barbecue. A pit 6 ft. wide and 50 ft. long was excavated, in which was barbecued 1300 lb. of pork and lamb. To season this quantity of meat required 40 lb. of butter, 50 lb. of lard, 10 lb. red pepper, 20 lb. black pepper, 5 gal. catsup and 8 gal. sauce, all cooked in a 40-gal. kettle. Six cords of green hickory wood were used in the cooking, fire being started under the meat at 6 o'clock the evening before. In addition, there was provided 400 loaves of bread, 25 gal. pickles, 15 gal. cold slaw and 75 cases soft drinks.

The program was started with a ball game between the Clinkers and Lime Rocks, resulting in a victory for the Clinkers. After the ball game there was a parade of the Safety Committee from the plant to the ball park. Interesting talks were then delivered by Superintendent Klein and President Hardy, of the Dixie company; Mr. Herron, Commissioner of Fire and Police of Chattanooga, and Mr. Cotcher, Safety Director of Chattanooga. This was followed by a quartet made up of members of the Safety Committee, who rendered an original song entitled "Goodbye Accidents," which was received with much enthusiasm. Dick Park, announcer of WDOD, also Secretary of Chattanooga Automobile Club, concluded the program with his well-known negro sermon.

The crowd, estimated at 2000, was then served with all the good eats enumerated.

Music was furnished throughout the afternoon by the South Pittsburgh High School Band.

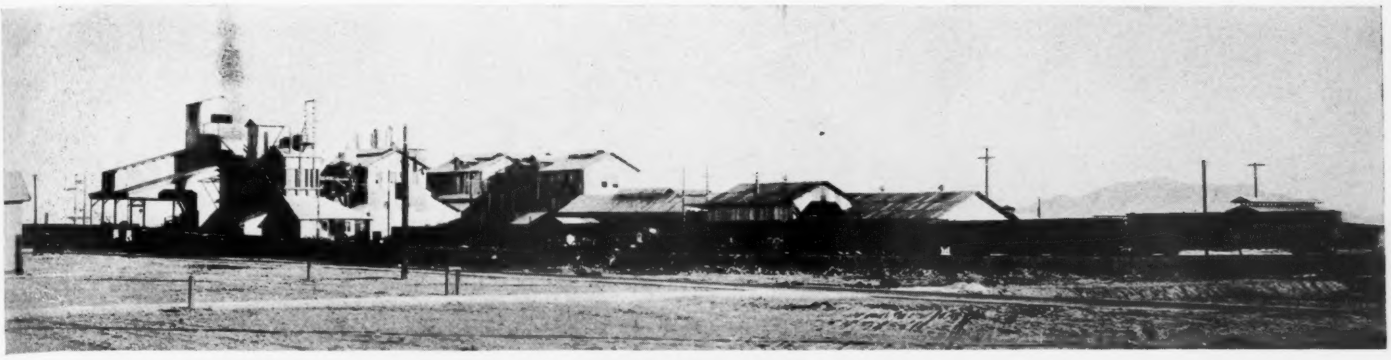
All present agreed it was a big day and are looking forward to sticking the company for another feed at the end of the next period of three months.

Although we were somewhat apprehensive after noting the quantities consumed by some present, no casualties have been reported.

Not Entirely Consistent!

A RESOLUTION urging members of the South Dakota Retail Lumbermen's association to purchase cement from the state owned plant at Rapid City was adopted by the association during its annual convention held at Sioux Falls recently. A resolution was also adopted declaring state-owned commercial enterprises should be discouraged in the future—particularly in the retail lumber business, we presume.

Safety celebration held by the two safety crews, the "Lime Rocks" and the "Clinkers" of the Dixie Portland Cement Co. The company provided a barbecue which, to judge from the left-hand picture, was a generous one



Railroad side of plant

Pacific Portland Cement Company Completes Imperial Valley Gypsum Plant

Developing One of the Largest and Purest Gypsum Deposits in the World

THE plant of the Pacific Portland Cement Co., Consolidated, at Plaster City, in the Imperial Valley in California, is especially remarkable for two things. One of these is that it is working on what is probably the largest and purest deposit of gypsum rock that has yet been discovered, and the other is that the plant is situated in one of the hottest spots on the earth's surface. The latter fact has had its influence on the design and operation of the plant, and plenty of ice and good living conditions have to be provided for the men who work there.

The deposit is worked by well-drilling and blasting the face in 36-ft. benches. An Armstrong well drill is used with a six-inch point, and the explosive is Porphery Special Hercules powder, a little slower than 40% nitro glycerine and of about the same strength. A Marion steam shovel and a Pawling and Harnischfeger gas shovel load the broken rock into 30-tons cars in which it is drawn to the plant on the main line of the San Diego and Arizona railway over 27 miles of narrow gage track.

Arrived at the plant the rock is taken by 10-ton skips which are hoisted by an electric hoist to the hopper of the 32x44-in. Ehrsam jaw crusher. The discharge from this goes to two Ehrsam pot crushers which reduce it to 1-in. size and less. Raymond fans collect the dust from these crushers and send it to the agricultural gypsum bin.

The discharge from these crushers (except the dust) goes to concrete bins. A screw conveyor takes it from these bins to the Raymond mill bins or to cars to be shipped as crude gypsum.

There are five Raymond mills, each provided with its individual motor. The product goes to the Raymond air-separating system from which the finished product goes to the land plaster bins from which the kettles are fed, while that which requires further grinding is returned to the mills.

For calcining there are three 10-ft. Ehrsam kettles, each of which can produce 100 tons of calcined product daily. The kettles are charged by elevators. Oil is used as fuel.

The "hot pit" bins into which the kettles

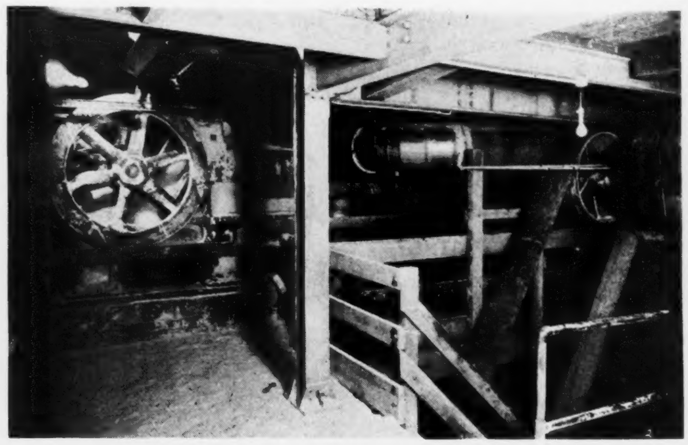
Buildings and yards of Pacific Portland Cement Co., Consolidated, gypsum plant at Plaster City, Calif. It is situated in one of the hottest spots on the continent

The quarry is 27 miles from the plant with which it is connected by a narrow-gage railroad. Steam and gas shovels load the broken rock into 30-ton cars for transportation. Steam locomotives pull long trains of these cars

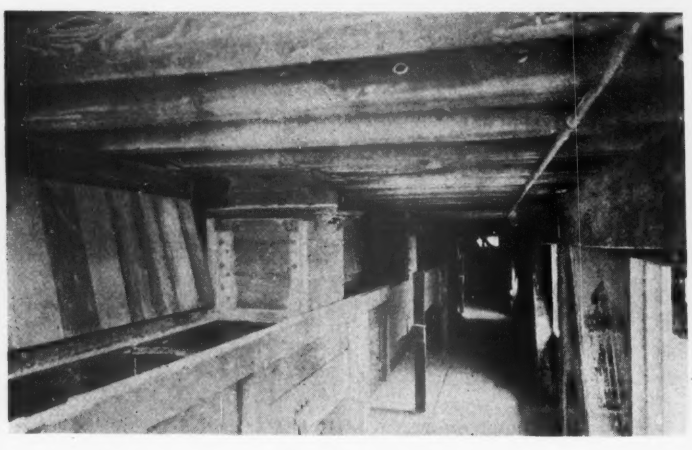
are discharged are placed below the ground level and elevators lift the contents to a double circulating screw conveyor which feeds the regrind burr stone mills. Automatic samplers are placed on the front of the elevators.

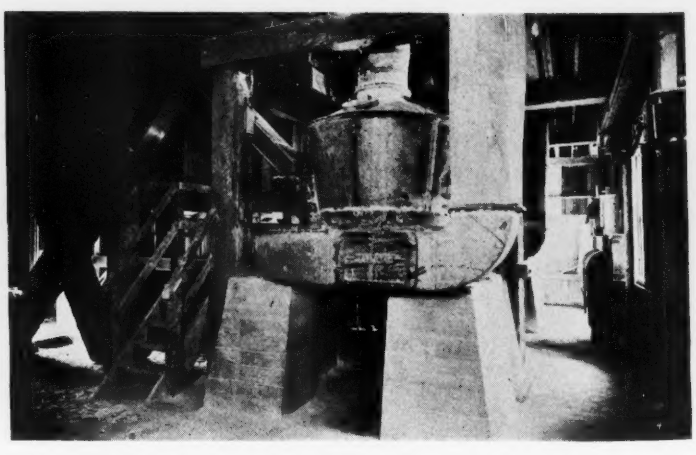
The regrind mill product goes to the stock house in which are situated the mixers and the sackers. The mixing hoppers are provided with signal lights by which the position of the gate may be regulated. Bates valve-bag sackers put the finished product into cloth bags for shipment. A sack repair department is a part of the plant.

The products of this plant are agricultural gypsum, crude gypsum for cement retarder, hardwall and finish building plasters, and casting, molding and dental plasters.

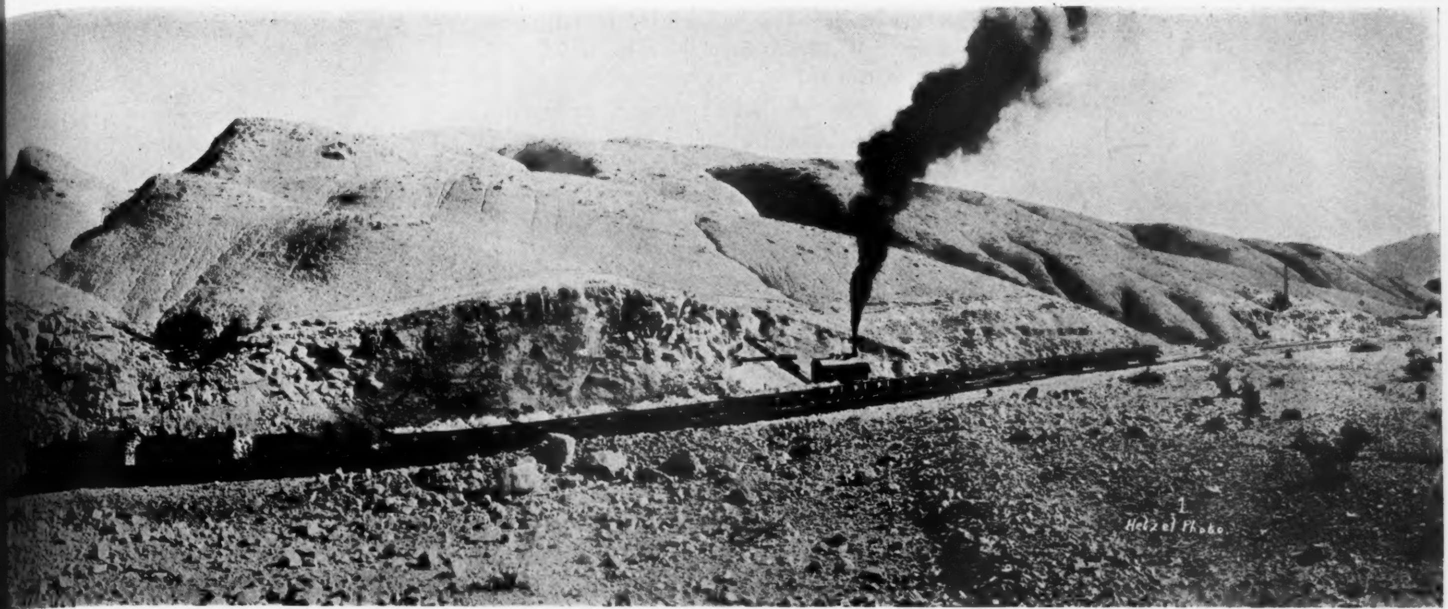


Left—The rock is taken in 10-ton skips and hoisted above the crusher. Right—The 32x44-in. jaw crusher. The discharge from this goes to two rotary crushers





Left—Conveyor system under bins by which crushed gypsum is sent to Raymond mills. There are five of these of the type shown at the right



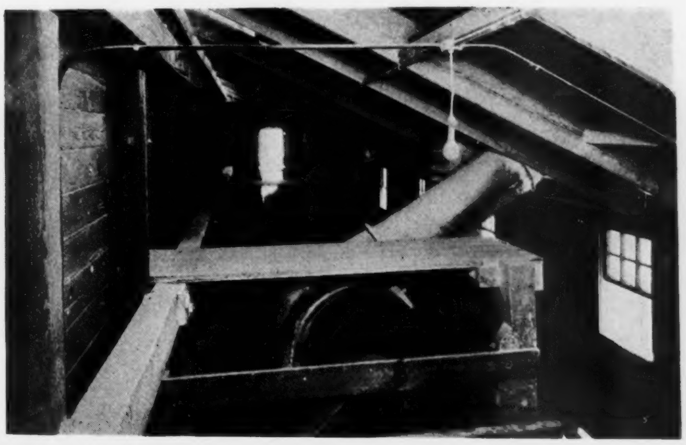
This deposit is said to be the largest and purest deposit of gypsum which has yet been discovered. It is really a "mountain of gypsum." Operations are carried on by well-drill-hole blasting in regular quarry style

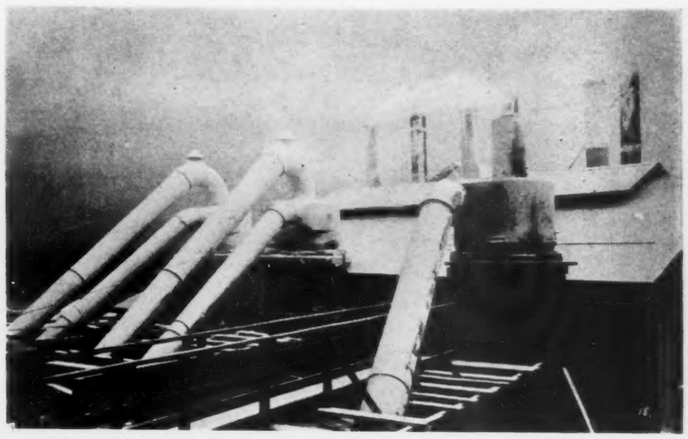
In addition to these the company is installing machinery to make gypsum building tile. The present capacity of the plant is 300 tons of calcined gypsum per day.

The present plant buildings are of wood covered with corrugated steel sheets, which is the commonest type of industrial structure throughout the desert country. But these are to be superceded by steel and concrete structures of the same type as are built at the other plants of this company.

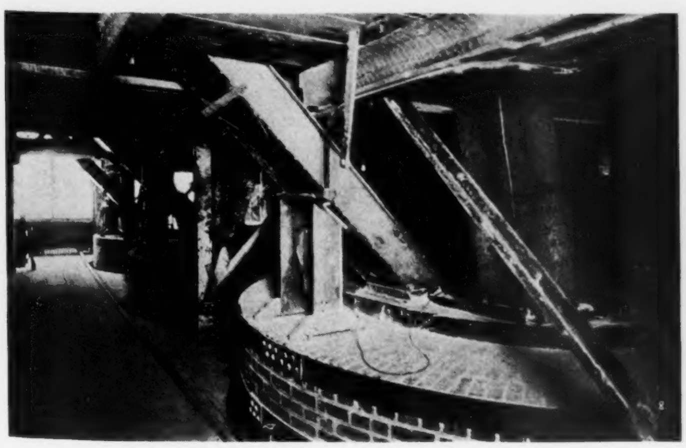
The machine shop is especially complete, as the plant is not situated close to a place from which repair parts may be quickly obtained. The facilities of the machine shop are so good that a complete narrow gage locomotive has been built in it.

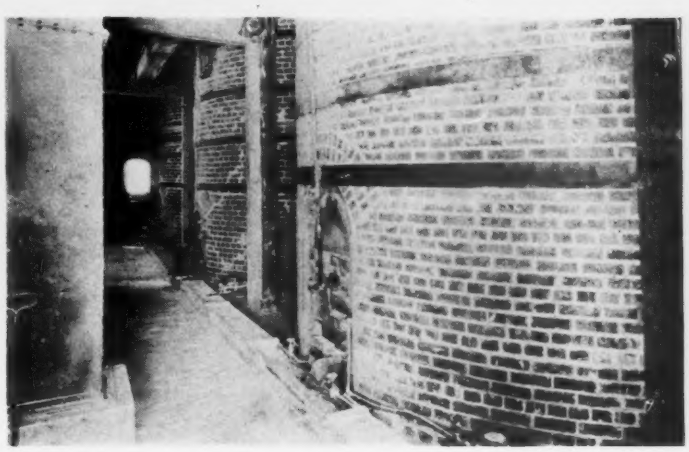
Water is obtained from Dixieland, a long



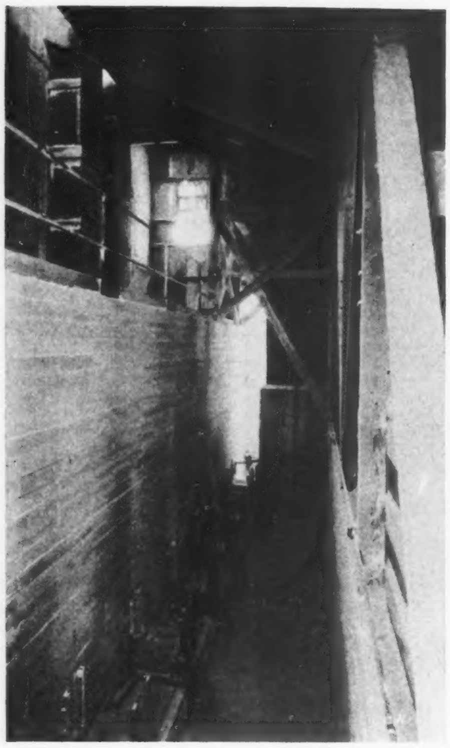


Left—The Raymond mill fans that draw the discharge of the mills and send it to the air separators shown on the right. The ground product is ready for the calcining kettles





Two views of the 10-ft. calcining kettles. There are three of these and each will turn out 100 tons daily of calcined plaster. Oil is used as fuel and the pipes and burners may be seen in the cut at the right. The left-hand cut shows charging chutes and connection with "fog boxes"



The "hot-pit" bins into which the discharge from the kettles falls. Automatic samplers are installed to sample the product as it comes from these bins

pipe line having been constructed to bring it from that place, where there is an irrigation system fed by the Colorado river.

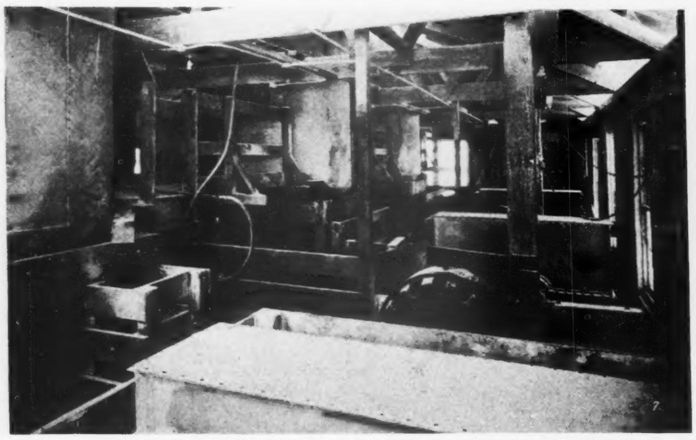
All the men are housed and fed at the plant and as good living accommodations are provided as are possible under desert conditions. Abundant ice is furnished by the company's ice plant and other luxuries are provided. One of these is a powerful radio set capable of receiving programs from the Atlantic seaboard.

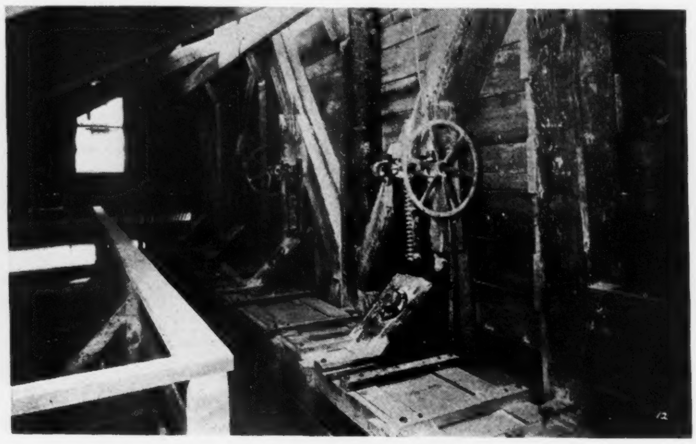
The entire plant is under the superintendence of C. G. Watson, of San Diego, who is an engineer very well known in California from his connection with hydroelectric and other enterprises on the west coast, including the big cement plant of the company at Redwood City.

This property formerly belonged to the Imperial Valley Gypsum and Oil Co., and was taken over by the present owners in the early part of last year. The original installation consisted only of a crushing plant and bins and this has been added to and rebuilt to make the present plant.

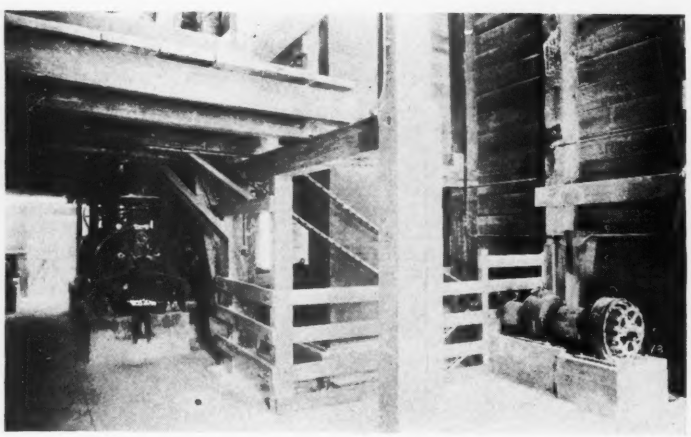
The main offices of the Pacific Portland Cement Co., Consolidated, are in San Francisco. The company has another gypsum plant at Gerlach, Nev., (described in Rock Products for Nov. 1, 1924) and cement

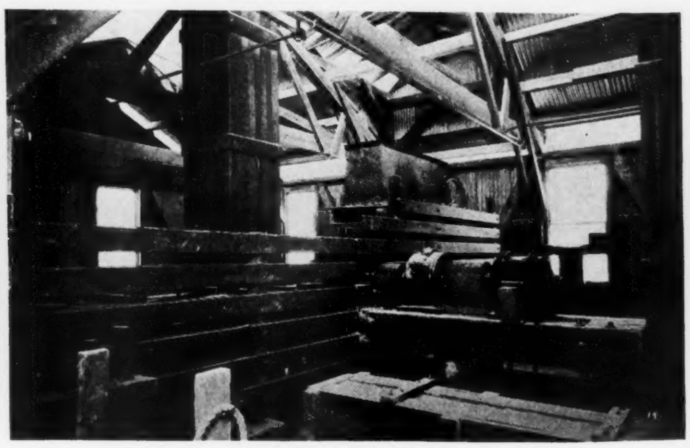
Fan and pipes that draw the dust from primary and rotary crushers and send it to bins. This dust is sold for fertilizer, or agricultural gypsum





Left—Floor over kettles showing kettle drives and fog boxes. Top of elevators for charging kettles at the right. Right—Double circulating screw conveyor that feeds the regrind mills beneath

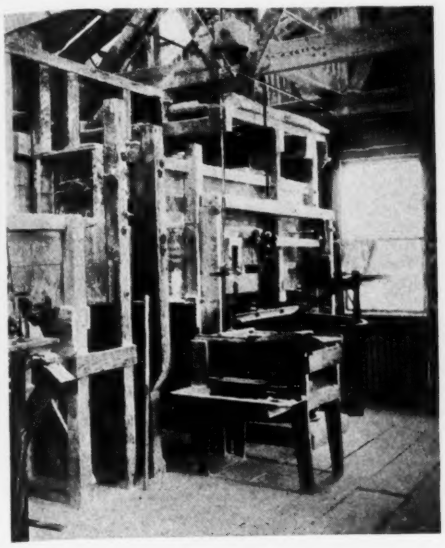




Left—The stone regrind mills for the finished plaster. Right—Showing how all the bins are ventilated with wooden ventilators

plants at Cement City and Redwood City, Calif.

The pictures herewith were taken especially to accompany this story. They are of more than usual interest in that they



Mixing hopper with tell-tale light signals to register the position of the mixing gate

Close-up of a gas shovel loading broken gypsum rock in the quarry

show the details of manufacture from the quarry to the finished plaster being sacked ready for shipment.

Gypsum Lath Popular in California

A TOTAL of approximately 36,000,000 sq. ft. of gypsum-centered plaster lath is consumed annually in Southern California, according to a report issued by O. D. Goerz, member of the General Committee of Plaster Board Industries, representing the local manufacturers of the product.

According to the report the plaster lath is used principally on the interiors of structures as a backing for plaster, and also for the exteriors of buildings, between the wood studding and stucco.

"The advantages of gypsum-centered plaster lath are becoming recognized generally in this territory and architects and builders are specifying the product where ever a fire-resisting, flexible and durable lathing material is required," the report stated.

In order adequately to supply the demand, local manufacturers and dealers keep in stock a total of approximately 5,000,000 sq. ft. of gypsum-centered plaster lath.

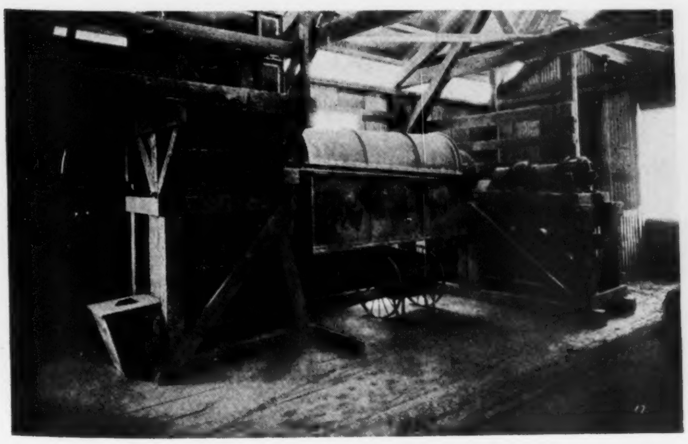
Manufacturers claim that plaster lath is virtually sound-proof, flexible and durable, fire-retarding to the extreme, and does not shrink, warp, buckle, bulge, rust, stain or decay. The local industry makes use of approximately 50,000 tons of gypsum annually. *Los Angeles (Calif.) Examiner.*

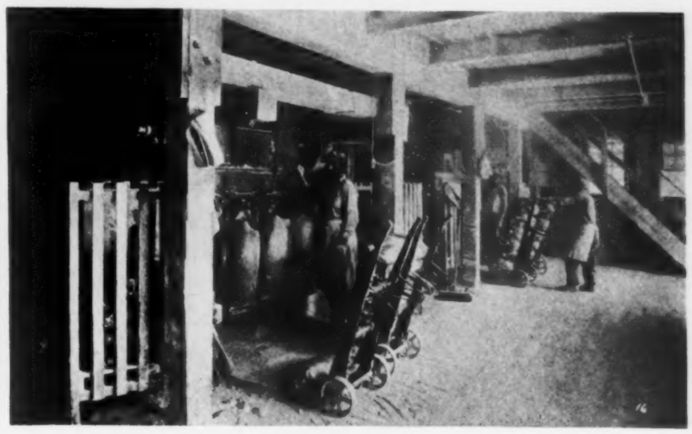
Car Shipments of Various Products

A VERY neat report on commodity car loadings for 1924 has been issued by the American Railway Association, car service division. It is interesting to note from this the position of rock products industries. Mineral products furnished the greatest number of carloads (12,794,674) as compared with agricultural products (7,114,918), forest products (3,780,341) and manufactured products (9,921,986). Of the mineral products, almost half was bituminous coal (6,190,056 cars) with clay, gravel, sand and stone in the second place with 2,745,028 cars. Of this we know that 2,718,500 cars were stone and sand and gravel from the reports furnished Rock Products by the association. Anthracite coal (1,549,534) and iron ore (1,009,293) are the only other mineral products in which the loadings pass a million carloads.

Cement, lime and plaster are rated as manufactured articles. Cement loadings were 605,384 cars and lime and plaster 234,477 cars. If we add these to the stone, sand and gravel shipments we have 3,558,361 cars, and if the agricultural limestone and rock phosphate shipments (classified as fertilizers) were to be added it is probable that the total rock products shipments would be about two-thirds of the shipments of bituminous coal.

It is interesting to compare the weights of carloads of different commodities. Animal products are lowest with only 11.8 tons per car. Other agriculaural products run 24.4 tons per car, manufactured products 25.9 tons and forest products 28.1 tons. Mineral products as a whole average 49.7 tons and sand, rock and gravel loads are almost at the average figure, 49.8 tons.





Left—This shows the method of mixing the retarder with the finished plaster. Right—Sacking plaster for shipment

Hints and Helps for Superintendents

Handling Waste Screenings

AT the plant of the Linwood Cement Co., Davenport, Iowa, a unique scheme has been developed for the disposal of waste screenings—material ¼-in. and down, generally sold for agricultural limestone and for macadam roads.

The plant is so arranged that there is not sufficient bin capacity to hold these screenings and so, by means of a system of conveyors underneath the plant, the material is stored outside or loaded direct into cars.

The scheme of operation is shown in the accompanying sketch. The waste from the screen falls onto an 18 in. by 10 ft. belt conveyor, which discharges to another belt conveyor, 18 in. by 30 ft., set at right angles to the first. The second conveyor discharges to an 18 in. by 40 ft. Barber-Greene loader, which is pivoted at the feed end and from there, approximately 15 ft., it is secured to an A-frame, which travels on a rail, describing an arc. This conveyor is belt driven from a 5-h.p. motor. By moving the A-frame it is possible to direct the discharge into storage pile or direct into cars for shipment.

Neat Design for a Re-Screening Plant

RE-SCREENING plants are used in many places where sand and gravel are unloaded in quantities and afterward loaded into trucks by a crane. Their purpose is usually twofold. They assure a cleaner gravel and also they permit a mixed gravel product, such as might be unloaded from a barge, to be stored and separated into sizes before being sold.

Often such re-screening plants are poorly constructed affairs of timber which under the shock of loading become shaky. They also give the place a slovenly appearance.

The design shown here is exceptionally neat. There is a hopper large enough to contain what the clamshell bucket of the crane will discharge with excess space so that operation will be practically continuous. A chute leads from this hopper to a cylindrical screen. The screen has two perforated metal sections, the finer size coming first, of course. The screen has a steel housing and this rests on the bins.

A neat design for a re-screening plant for use with truck delivery

The bins have hopper bottoms and segmental gates for discharging the gravel.

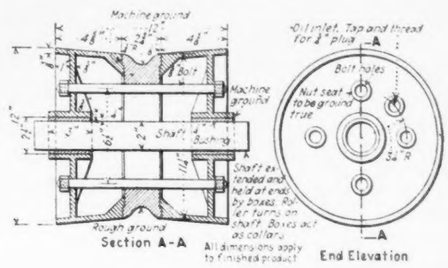
While there is nothing unusual in the design of this plant in a mechanical way, the neat and even ornamental features of the design make it well worth a place in this "Hints and Helps" section. It is used on the dock of the Marine Sand and Gravel Co., Baltimore, Md.

Self-Oiling Rope Roller

A COMPOSITE rope roller of manganese steel and gray iron, designed by Stanley A. Arnot, superintendent of the Plymouth mine, at Plymouth, Calif., is used in the Plymouth shaft and has given excellent service. The shaft, which is vertical above the 1600 level, joins an incline extending to a depth of 4,378 ft. measured on the incline. The bottom of the sump is 3920 ft. vertically below the collar.

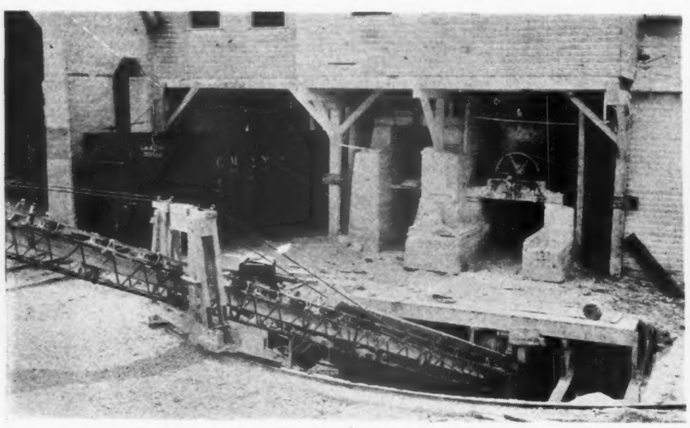
The rollers at the turn of the shaft are subjected to severe service, and designs have been changed until a satisfactory type was evolved. Such rollers should be as light as possible and should require attention only at infrequent intervals. In other words, they should function automatically over long periods of time.

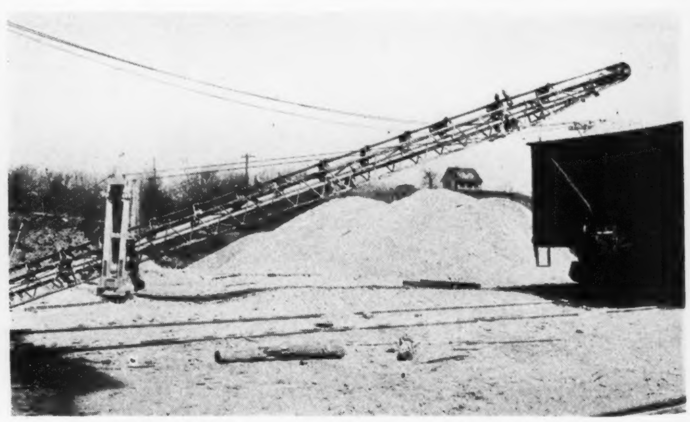
The roller is made in three pieces, an inner bearing ring of manganese steel, grooved to receive the rope, and two outer



Roller for rope haulage that will wear long and is self-lubricating

drums of cast iron which provide sufficient width to take care of the lateral play of the rope. The drums and the central ring are held together by four ⅝-in. bolts. The 2-in. shaft is stationary and is supported





Two views of the loader showing the A-frame on its circular track. The right-hand view shows how it may be moved to the stockpile or to a railroad car

by boxes which act as collars. The bearings of the roller are bushed and are each 3 in. long. A ¾ in. opening, closed by a plug, is provided for introducing lubricating oil, which partly fills the inner chamber. *Engineering and Mining Journal-Press.*

[The above roller designed for use in a mine shaft would be equally good on any outside installation of rope haulage. Self-oiling equipment soon saves the difference in cost.—Ed.]

A Simple Conveyor Tripper

A STORAGE plant was installed by the Massaponax Sand and Gravel Corp., Fredericksburg, Va., and a tripper was needed as a part of the installation. The plant consists of a 400 ft. conveyor belt on a trestle and the tripper was needed to make the belt discharge wherever wanted along the length of the belt.

The regulation tripper with propelling motor and gearing is a somewhat expensive affair. This tripper cost only $25 to build. It is not so efficient or "handy" in some ways as the regulation tripper, but it serves its purpose very well and has given satisfaction through several months of service.

The construction is very simple. There is first a frame with axles and ordinary small car wheels which run on a track the length of the trestle. On this frame are two slanting pieces of timber on which are bolted ordinary cast iron bearings fitted with grease cups. In these bearings are the shafts of two 12-in. pulleys, 30-in. long, which are set one above the other, the upper pulley being placed ahead in the direction that the belt runs.

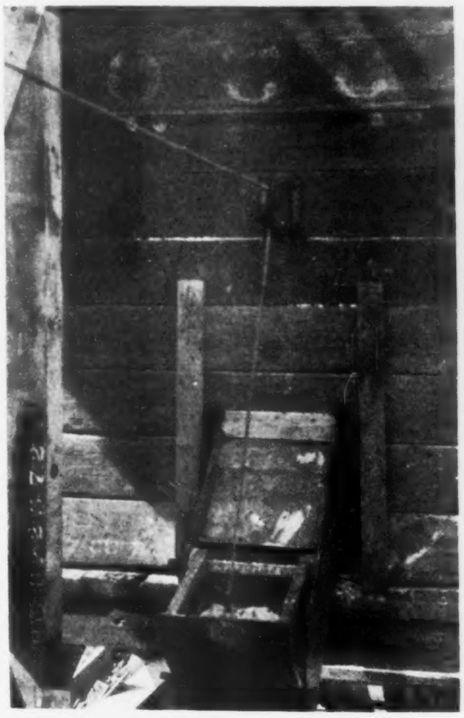
In front of the upper pulley is a shield of boards which prevents the discharged material from being thrown on the belt. Below this pulley is a double chute by which the material that is discharged is spouted to the sides.

When the tripper has to be moved a bar is thrust into one of the pulleys to prevent it from turning. The belt is then run and it drags the tripper with it to the required position. When this is reached the belt is stopped and the bar is removed.

As the tripper has to be moved back as well as forward, the motor which runs the belt conveyor is provided with a reversing switch so that the belt can be run either way, taking the tripper with it. This tripper was designed and built by W. C. Davis, the vice-president of the company.

Closing a Gate at a Distance

A "QUADRANT" gate of the type shown in the cut may be opened and closed at a distance by means of a cord running over pulleys and this is sometimes of considerable advantage. In the example shown the gate is on a hopper which receives the feed of the plant. This discharges through the gate on a belt that takes it to a scalping screen, the oversize of which goes to two crushers. The belt is 140 ft. long and in case anything caused the crushers or the screens to be shut down a great deal of feed ran out on the belt and was carried up to the screen before the attendant could run down to the gate and close it. After the gate was rigged with a cord there was no further trouble from too much feed following a shut down of the screen.



Close-up of the gate, rope, and pulley

The rope runs from this bin to the other end of the conveyor 140 ft. distant

This arrangement is in use at the Franklinville plant of the J. E. Carroll Sand Co., Buffalo, N. Y.

Left—The two pulleys are mounted in ordinary bearings on a diagonal member that is fastened to a frame on wheels. Right—The tripper in place over the stockpile of gravel

German Cement Industry in 1924

Prices Lower but Only 60 Per Cent of Pre-War Sales Made and Industry Operating at One-Third Capacity

According to the chairman of the "Zementbund" (German Cement Association), cement prices were reduced for the first time since the war, falling from 45 marks per ton at the end of 1923 to 37 marks per ton at the end of 1924. The average price, f.o.b. factory, is therefore only 20% above the pre-war price, although gradual increases in freight rates, coal and wages are apparent, ranging from 22 to 60% higher than prior to the war. Total cement sales during 1924 exceeded 4,000,000 tons, only 60% of pre-war yearly sales and only one-third of the full capacity of the German cement industry. Exports totaled 530,000 tons, or approximately 12.5% of the entire production. It is of interest to compare these figures with the world cement production. In 1880, the world production totaled about 10,000,000 bbl., of which approximately 22.5% (about 2,250,000 bbl.) originated in Germany. In 1913 the world cement production had risen to 250,000,000 bbl., in which total Germany shared 42,000,000 bbl. or 15%. The 1924 world production may be estimated at 420,000,000 bbl., in which Germany shares but 25,000,000 bbl. or 6%. The recent efforts of the industry to improve the quality of its products have been very successful, evidenced by the constantly increasing sales, which already amount to 2% of the monthly average during the last five months in 1924. Official statistics of Germany's export of portland cement in 1924 are appended:

Country of destination:	Amount in 100 kg.
Brazil	799,783
Netherlands	734,593
Peru	279,538
Chile	272,285
Japan	170,962
India	170,937
South Africa	150,019
Ecuador	86,539
Norway	80,491
Lithuania	58,996
Austria	18,919
Polish Upper Silesia	16,987
Other countries	1,046,704
Total	3,997,917

Eight-Hour Day Abandoned

The eight-hour day applied during the period 1918-1923 was abandoned in 1924 in view of the general industrial depression. From the standpoint of the employers, the change justified itself in the light of results achieved. The cement production in 1924 was increased by 470,000 tons over the previous year at the same that that the number of employes was reduced from 22,394 in 1923 to 15,780 in 1924. Considering the increased production and the increased amount of work rendered per capita, 18,936 employes would have been required in 1924 under an eight-hour day. The resumption of the 10-hour day resulted therefore in a saving of 3458 full-time employes, or 27.9%.

The production of high grade cement by the German industry during 1924 necessitated a revision of cement standards. The new German high grade cement will harden within three days to an adequate firmness (250 kg. pressure per square centimeter), which ordinary cement attains only after 28 days. The commission of standardization decided on the establishment of three standards, as follows:

GERMAN PORTLAND CEMENT STANDARDS

		In lb. per sq. in.
Pressure capacity per kg./qcm. after 3 days of watering	....	....
Pressure capacity per kg./qcm. after 7 days of watering	120	1715
Pressure capacity per kg./qcm. after 28 days of watering	200	2860
Pressure capacity per kg./qcm. after 28 days of combined wet and dry storing	250	3570
PORTLAND CEMENT A		
Pressure capacity per kg./qcm. after 3 days of watering	....	....
Pressure capacity per kg./qcm. after 7 days of watering	170	2430
Pressure capacity per kg./qcm. after 28 days of watering	280	4000
Pressure capacity per kg./qcm. after 28 days of combined wet and dry storing	350	5000
HIGH GRADE CEMENT		
Pressure capacity per kg./qcm. after 3 days of watering	250	3570
Pressure capacity per kg./qcm. after 7 days of watering	320	4570
Pressure capacity per kg./qcm. after 28 days of watering	400	5720
Pressure capacity per kg./qcm. after 28 days of combined wet and dry storing	450	6430

In questionable cases the 28 days combined wet and dry test is to be employed for high grade cement, also the three days watering test. In order to facilitate cement testing, the application of the tensile strength test is also permitted.

Recent Developments in the Cement Industry

In a speech delivered to the Institute of Engineers and Shipbuilders, Glasgow, Scotland, Cecil H. Desch, D.S., F.R.S., sketched roughly recent developments in the cement industry. He commented upon the little attention that is given to the chemistry of cement in England and upon the work of the Geophysical Laboratory at Washington, D. C., on igneous rock magmas and its investigations of the lime-silica, lime-alumina, and silica-alumina systems.

The setting of wetted cement, he pointed out, is due to the decomposition of the aluminates into colloidal alumina and of the tricalcium silicate into mono-calcium silicate and calcium hydroxide; the hydroxide slowly crystallizing in a colloidal matrix.

The Roman practice of adding "puzzolana," a decomposed volcanic ash found at Puzzuoli, Italy, to mixtures of lime and sand has lead to the adoption of the term "puzzolanic materials" for substances added to give increased strength to cements.

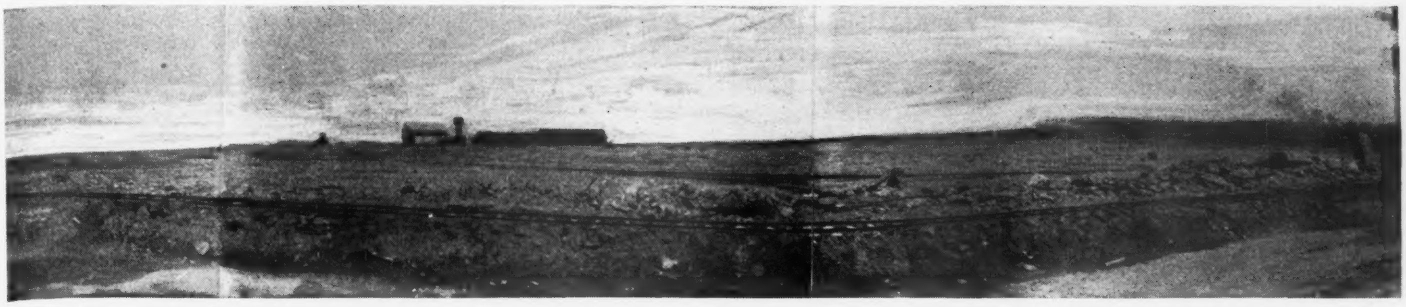
He cites the recent manufacture of high alumina cements as a departure from old methods, as in "Ciment fondu," a cement made from bauxitic clay and easily recognizable by its high content of metallic iron. This cement, because of its low silicate content, reacts quickly with water and attains a maximum hardness in a comparatively short time and is thus favored as a road-building material.

Oklahoma Cement Employes Operate Own Insurance Company

Employes of the Oklahoma Portland Cement Co., Ada, Okla., have their own health insurance company. When a member of the association becomes sick, he draws $1.50 a day as long as he or she is sick, not exceeding 100 days. In case of death a member's relatives receive $200. The fees are only 80 cents a month, but may be increased to as much as $3 a year additional in case of emergency caused by epidemics or the like.

The association, known as the Oklahoma Portland Cement Co. Employes Benefit Association, was organized in 1923. Since its organization a total of $5667.40 has been paid into the treasury. Of this amount $4088 has been paid out for sickness and death. The operating expense has totaled $505. Eighty cents in dues has been refunded, and there is a balance in the treasury of $1073.60.

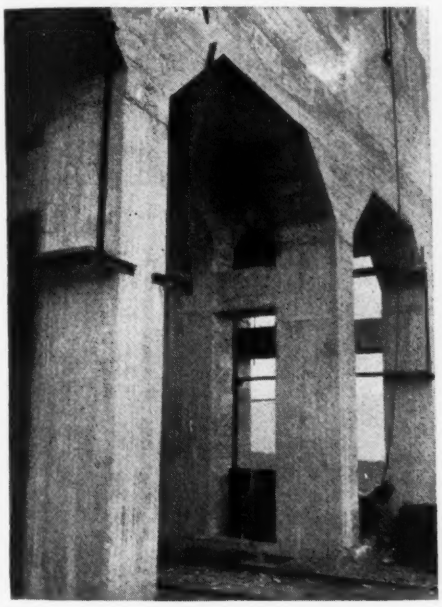
At the annual meeting of the members held recently, the following were elected as directors: S. D. McIlroy, J. W. Smith, R. W. White, Lee F. Smith and Claude McMillan. The directors elected Claude McMillan, president; R. W. White, vice-president, and Lee F. Smith, secretary-treasurer. —*Ada (Okla.) News.*



Panorama of the quarry working which shows the great area that has been worked over during the long life of this operation

General Crushed Stone Plant at Akron, New York

A Modern Crushing Plant of Compact and Simple Design Replaces the Plant Which Was Struck by Lightning and Burned About a Year Ago



Detail of concrete columns supporting the bins

LAST summer (1924) the crushing plant of the General Crushed Stone Co. near Akron, N. Y., was struck by lightning and before the fire which was started could be extinguished the plant was practically destroyed. Some of the crushers were not so bady damaged but that they could be rebuilt and put in service again and some of the crusher foundations were found to be serviceable. These were the foundations made of concrete in which crushed limestone was used as aggregate, a test which proves the exceptional fire resisting qualities of this material.

The quarry has been operated for almost 20 years and a large acreage has been worked over. This occupies the flat top of a hill and the ground slopes away sharply from it at the rear of the hill. The crushing plant is placed below so that the track on which the quarry cars enter the upper part of the plant is at practically the same level of the quarry floor.

A Rock Products editor visited the opera-

The secondary crushers and elevator to screens

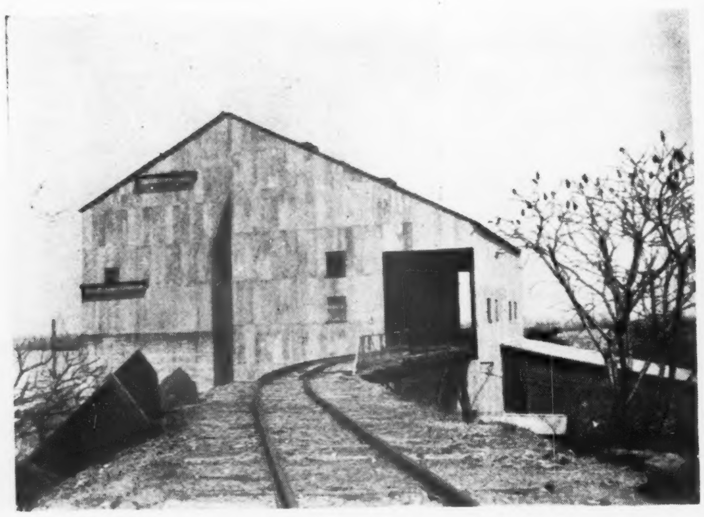
The new crushing plant is at the left. The water tower, machine and blacksmith shop and the locomotive house were not destroyed when the plant was struck by lightning last year

tion about the first of May, at which time the crushing plant was almost ready to operate. The only work being done in the quarry was that of stripping the ground and putting down well-drill holes. A Marion Model 91 steam shovel and three Loomis Clipper drills were employed in this work and a very considerable area had been made ready for the future. This shovel and a companion one which will be employed in loading cars as soon as the work starts are both mounted on crawler treads.

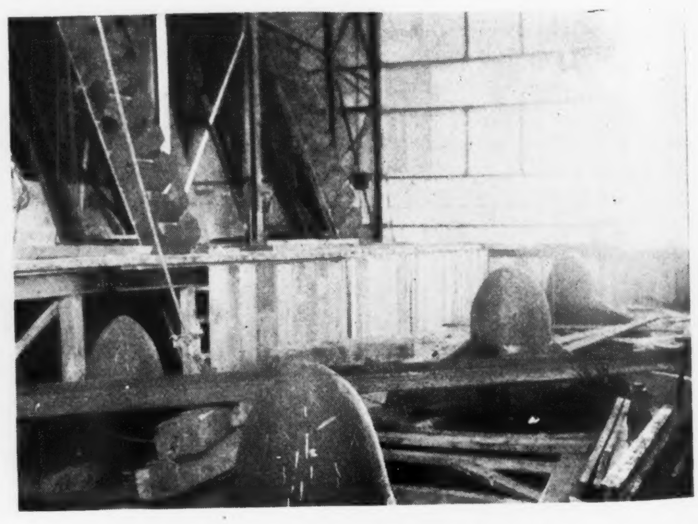
For conveying the broken stone to the plant the company has six Lima dinky locomotives and a number of Western side-dump cars. An American 125-ton standard gage locomotive is a part of the equipment used for shifting cars in the yard below the plant.

The design of the plant is very compact. The cars are run into the plant above the crushers and dumped to the two primary crushers, which are No. 10 gyratories. The crushed product goes to screens on the upper floor. The oversize of these screens goes to a conveyor which takes it to the secondary crushers. There are three secondary

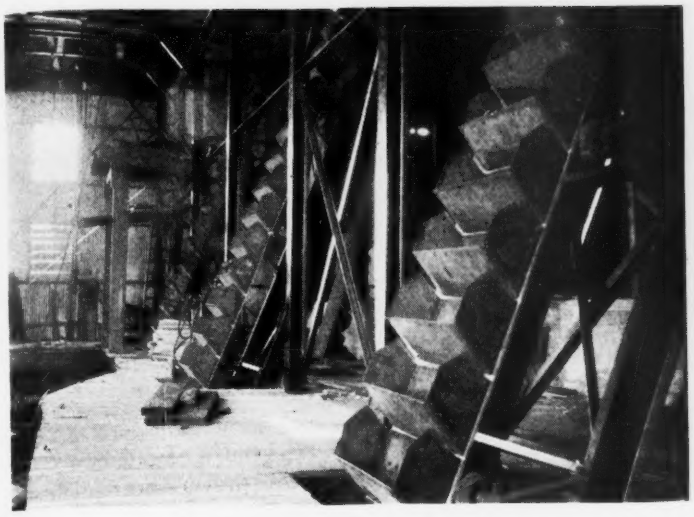

Left—Stripping operations going on while the plant is getting ready. Right—Steam shovel loading strippings

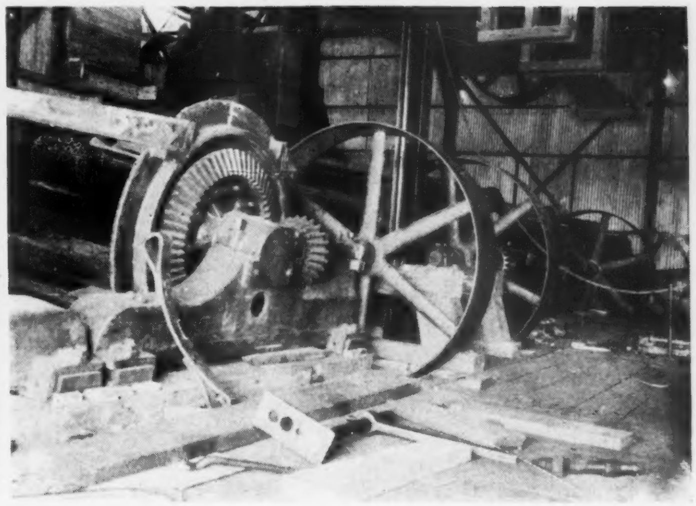



Left—Upper part of plant where cars are received from the quarry. Right—Concrete bins over loading tracks

Left—Looking along the crushers on the lower floor. Right—The crushers as seen from the feed floor (taken during construction.)





Left—Elevators from the crushers pass through the feed floor. Right—Screens on the floor above (taken during construction

crushers, two No. 6 gyratories and a No. 8 gyratory. Two elevators take the products of these crushers to the screens so that the feed is held in closed circuit until it is reduced to finished sizes. All screens for both primary and secondary crushing (eight in number) are placed in a line on the same floor.

Crushers and screens are of Allis-Chalmers design and make. The elevators are of the close-connected bucket and belt type, also of Allis-Chalmers make.

The products of the plant are railroad ballast and sizes known as No. 2, No. 3 and No. 4, "half-inch" and "sand." The screen openings are 2⅞-in., 2-in. and ¾-in., the last in the jackets. Two of the screens have jackets with ¼-in. perforations. These are in circuit with one of the crushers and an elevator for making the finer sizes.

The bins into which the finished products fall are splendidly constructed of concrete supported on concrete columns. Cars are loaded through bottom gates.

The entire plant is electrified. The electrical equipment was wholly destroyed by the fire and everything electrical, including the transformers, was newly installed. All motors are of Allis-Chalmers make except the synchronous motor which drives the Ingersoll-Rand air compressor, which is of Westinghouse make. The current for these comes from Niagara Falls.

Sixty to 75% of the product is sold for railroad ballast. The remainder is used for highway building and as commercial crushed stone.

Water supply is from a concrete lined reservoir into which water is pumped from a well by a reciprocating steam pump run by compressed air. An electrically driven centrifugal pump lifts the water from this reservoir and sends it to the water tower and plant lines.

J. D. Hawthorne is manager of the operation. The office as at the plant. The General Crushed Stone Co. has its main office at Easton, Penn., and operates plants in a number of states. John Rice, president of the company, is a past-president of the National Crushed Stone Association, and Otho M. Graves, general manager, is the present president of the Association.

New Kreiss Phosphate Plant

THE Kreiss Potassium Phosphate Co., employing a process for making a commercial fertilizer which was noted in ROCK PRODUCTS for November 17, has a plant in operation at Lakeland, Fla., and is building another at Tampa. The new plant is thus described in a telegram to the *Manufacturer's Record:*

Tampa, Fla., May 4.

Erecting potassium phosphate treating plant under Kreiss patents, Estuary property. Purchased 700 ft. on Government channel; bulkheading and dredging 1000-ft. private ship channel; work started. Capacity 25,000 tons each unit. Main building 65 ft. high, 528 ft. long; stack 22-ft. base, 140 ft. high. Construction concrete, brick, steel, corrugated, riveted sides, wood bents.

Warehouses 65 by 185 ft. and 125 by 350 ft. Will import fertilizer materials and supply potassium phosphate for domestic and export trade; capacity of plant contracted for. Presses patented, same as in operation in Lakeland, Fla., by Non Acid Fertilizer Co. New plant necessary for increased demand. Could not be handled at Lakeland, owing to limited capacity. Kreiss & Son, designing and construction engineers. Contracts let Schofield Sons Co., Tampa, for kilns; Fairbanks-Morse Co., Chicago, motors; King Lumber Co., lumber; J. R. Chambers, Tampa, bulkheading and dredging; balance not let. Capitalization, $200,000. Close corporation backed by McNeill interests, Savannah, Ga., and Lakeland; Walter McNeill, president.

Kreiss Potassium Phosphate Co.

Shiely's Great Northern Ballast Plant Operating

THE new ballast plant of the Great Northern Ry. at Chinook, Mont., built and operated by J. L. Shiely Co., St. Paul, Minn., began operation on April 23. Photographs of this plant appeared in the April 18 issue of ROCK PRODUCTS and was described in other previous issues. W. R. Smith is general superintendent of the plant.

The concrete lined reservoir and pump house

Financial News and Comment

Wisconsin Lime and Cement Bond Offering

THE Central Trust Co. of Illinois, Chicago, are offering at 100 and interest $750,000 first closed mortgage, 6% serial gold bonds of the Wisconsin Lime and Cement Co., Chicago; in denominations of $1,000, $500 and $100.

The bonds are dated April 1, 1925; due serially April 1, 1927-1940. Interest payable A. & O. without deduction for any taxes except Federal income tax in excess of 2% redeemable on any interest date in the inverse order of maturity at 100 and interest plus a premium equal to ¼% for each year or fraction thereof by which the regular maturity is anticipated, with a minimum call price of 101.

Data from letter of Joseph Hock, president of the company:

Company—Incorporated April 7, 1900, in Illinois. Is one of the largest distributors of a diversified line of building materials in Chicago, or in the middle West. The original capital was $100,000, which has since been increased to an authorized $1,000,000, of which $939,375 has been paid in.

Company's 11 yards, of which 8, with a total area of 1,239,172 sq. ft., are owned in fee, have been carefully selected with reference to switch track facilities and adaptability as building material and coal distributing centers. The real estate, with the exception of one yard recently acquired, is improved with substantial brick buildings and the yards are equipped with the most modern and complete equipment for handling the various materials in which the company deals.

The Crystal Sand and Gravel plant, which the company purchased and equipped during 1924, is regarded by experts as the largest and most efficiently equipped plant of its kind in the Chicago district and the middle West. Its ownership furnishes the company its own source of supply in sand and gravel in a short, low rate haul, and should result in a substantial increase in earnings.

Purpose—To call and retire $220,000 outstanding first mortgage 7%, to reimburse the company for expenditures made in the acquisition and development of additional plants and facilities, and for general corporate purposes.

Net earnings after all charges, including depreciation but before Federal taxes and interest $186,897, 1922; $193,440, 1923; $304,753, 1924. The maximum annual interest requirement on this issue is $45,000, and has been earned during the last three years an average of five times. Earnings similarly stated for the last five years, including a loss of $72,527 due to general business depression in the year 1921, have averaged 3¾ times the maximum annual interest requirement.

Atlas Cement Bonds Called

ALL of the outstanding general and refunding sinking fund 25-year 6% gold bonds, due November 1, 1939, have been called for payment May 1 at 105 and interest at the Bankers Trust Co., 10 Wall street, New York City.

U. S. Gypsum Company Balance Sheet

BELOW is the balance sheet as of December 31, 1924, of the U. S. Gypsum Co., Chicago, Ill.:

	1924	1923
Assets—		
Property account	$20,793,860†	$14,519,743
Securities of other companies	24,485	14,850
Securities deposited for insurance reserve	102,602	....
Inventory	3,552,496	2,692,150
Accounts and notes receivable	3,781,590‡	3,057,308
Cash	1,277,287	477,571
U. S. government obligations	4.551,929	3,513,926
Deferred charges	162,342	131,853
Total	$34,246,591	$24,407,401
Liabilities—		
7% cumulative preferred stock	$ 9,032,900	$ 6,020,300
Common stock	8,786,960	5,911,680
Accounts payable	1,126,980	1,059,523
Accrued taxes, interest, etc.	1,140,849	899,318
Reserve for contingencies, etc.	1,563,222	1,471,531
Surplus	12,595,681	9,045,049
Total	$34,246,591	$24,407,401

†Includes plant, $18,626,091; gypsum and gypsite, $5,815,500; total, $24,441,591; deduct reserve for depreciation and depletion, $3,647,732. ‡Accounts and notes receivable, $3,885,914; deduct reserve for doubtful accounts, $104,324.

RECENT QUOTATIONS ON SECURITITS IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co.	May 11	100	100	110	
Arundel Corporation (sand and gravel—new stock)	May 11	No par	23½	23½	
Arundel Corporation	May 9	50	......	113½	
Atlas Portland Cement Co.	May 9	100	135	140	
Atlas Portland Cement Co. (preferred)	Apr. 30	100	120	......	
Boston Sand & Gravel Co.	Mar. 27	100	63½	63½	
Canada Cement Co., Ltd.	May 13	100	104½	105	1½% quar. Apr. 16
Canada Cement Co. Ltd. (preferred)	Apr. 30	100	113½	114¼	1¾% quar. May 16
Charles Warner Co. (lime, crushed stone, sand and gravel)	May 10	No par	21½	24	50c Apr. 10
Charles Warner Co. (preferred)	May 10	100	100	102	1¾% Apr. 23
Giant Portland Cement Co.	May 11	50	......	30	
Giant Portland Cement Co. (preferred)	May 8	50	53	53	
Ideal Cement Co.	May 11	No par	57	59	75c Mar. 31
Ideal Cement Co. (preferred)	May 11	100	108	110	1¾% quar. Mar. 31
International Cement Co. (common)	May 13	No par	64	64½	$1 Mar. 31
International Cement Co. (preferred)	May 11	100	103.5	105.0	1¾% quar. Mar. 31
International Portland Cement Co. (preferred)	Mar. 1	......	30	45	
Kelley Island Lime & Transport Co.	May 12	100	102	104	2% quar.
Lehigh Portland Cement Co.	May 9	......	70	72	1½% quar. Apr. 1
Michigan Limestone and Chemical Co. (preferred)	Apr. 11	100	......	......	1¾% quar. Apr. 15
Missouri Portland Cement Co.	May 13	25	51¾	52	50c May 1
Pacific Portland Cement Co., Consolidated	May 8	......	80½	......	
Peerless Portland Cement Co.*	Apr. 28	10	8¼	9	
Petoskey Portland Cement Co.*	Apr. 28	10	9⅛	10	1½% quar.
Pittsfield Lime and Stone Co. (preferred)	....	100	......	......	2% quar. Apr. 1
Rockland and Rockport Lime Corp. (1st preferred)	May 11	100	98	......	3½% semi-annual
Rockland and Rockport Lime Corp. (2nd preferred)	May 11	100	67	......	3% semi-annual
Rockland and Rockport Lime Corp. (common)	May 11	No par	57	......	1½% quar. May 1
Sandusky Cement Co. (common)	May 12	100	87	......	2% quar. Apr. 1, 100% payable in com. stock, Apr. 1
Santa Cruz Portland Cement Co. (bonds)	May 8	100	103½	......	6% annual
Santa Cruz Portland Cement Co. (common)	Apr. 25	50	......	60	$1 Apr. 1
Superior Portland Cement Co.	Mar. 1	100	......	120	
United States Gypsum Co. (common)	May 13	20	154	154½	40c quar. Mar. 30
United States Gypsum Co. (preferred)	May 8	100	114	116	1¾% quar. Mar. 30
Wabash Portland Cement Co.*	Apr. 28	......	50	75	
Wolverine Portland Cement Co.	May 13	10	11⅝	12¼	2% May 15

*Quotations by Watling, Lerchen & Co., Detroit, Mich.

Editorial Comment

Dolomite Possibilities

Elsewhere in this issue is the translation of what we believe is an extremely important contribution to the literature of portland cement. Dr. Balthasar has pointed the way to the manufacture of satisfactory portland cement containing as high as 8 per cent magnesia. A portland cement containing as little as 2 per cent magnesia has hitherto been looked upon as unsatisfactory. The importance of this contribution does not rest, however, on the immediate possibility or probability of the manufacture of magnesia portland cements in the United States, where high calcium limestones are well distributed and in immense quantities. Indeed, the process required, using a shaft kiln burning fuel briquetted with raw material, is one that is not at all practiced in this country.

The importance of the article is the light it throws on the constitution of portland cements—and on hydraulic cements generally. Apparently the key to the success of magnesia portland cements is the keeping of the clinker "in the sintering zone for some time with strongest calcination." In other words, thoroughly "dead burning" the magnesia, in which form it will not hydrate and cause unsound cement. The dead burned magnesia then becomes merely an inert filler or aggregate.

Curiously enough, in the manufacture of magnesia refractories from dolomite, the problem is just reverse. The magnesia is dead burned and rendered inert, but the calcium oxide can not be dead burned and eventually hydrates, causing the refractory brick to break up. This difficulty has been overcome in research work done at Ohio State University on dolomite refractories by adding silica and using a catalyst to convert all the lime (CaO) into tri-calcium-silicate ($3CaO\ SiO_2$). The finished refractory is then dead burned magnesia and comparatively large particles of tri-calcium silicate which will not hydrate.

The interesting problem is: Would the dolomite refractory developed at Ohio State University, pulverized, make a magnesia portland cement? Certainly these refractory investigations and research work have a direct bearing on the research work done on the constitution of portland cement at the Bureau of Standards, but as yet no attempt has been made to correlate them.

The whole field of mineralogical chemistry is so vast that it will probably be years before any agency can collect, collate and digest the knowledge we already possess, which if collected, collated and digested would throw much light on the chemistry and the constitution of portland cements. This work has now got a fine start in the United States and we only hope that portland cement manufacturers will have enough appreciation of pure science to have the patience to stay with the investigation for years of work that are ahead.

"He Said a Mouthful"

In an address before the Bureau of Advertising of the American Newspaper Publishers' Association in New York City on April 22, Frank O. Lowden, former governor of Illinois said: "We are coming to learn that unrestricted competition is not clothed with all the virtues it was once thought to possess. Unrestricted competition is but a form of warfare. Whether among the nations of the world for larger armaments or among the producers of useful commodities it has been found t entail losses to society far beyond the benefits it has conferred."

To use a slangy, but expressive phrase, Ex-Governor Lowden "said a mouthful." In a very few words he has explained and justified the modern movement toward control of industry through trade associations. For notwithstanding the Sherman law, or any other law that is or may be on the statute books of the United States or any state, trade associations do limit competition between producers—not by collusion but general intelligence. At their best, trade associations limit competition by giving their members a comprehensive understanding of their industry and its problems in a broad economic way. The function of a well managed trade journal is to do the same. Trade associations and trade journals are natural allies and their efforts supplement each other. When a trade association has to resort to illegal methods to accomplish necessary control of competition it is a reflection on the general intelligence of the producers in that industry, as much as on their morals.

Loss of the "Kelley Island"

In spite of the fact that much of the work in the rock products industries is of a hazardous nature, really serious accidents are today not so very common. Consequently such an accident as the capsizing of the dredge *Kelley Island* with the loss of nine lives comes as a shock. All evidence points to the fact that someone was careless and forgot to close a sea cock or a bulkhead opening. And this emphasizes the fact that cannot be too often called to attention, that all the safety devices in the world are just as effective as the men who work with them, and those in charge of the men make them. Everyone who has made a study of safety conditions has recognized this, and everyone who has had experience in handling men knows how hard it is to keep men from becoming careless and taking long chances.

Substantial New Eastern Plants Reflect Experience of Seasoned Producers

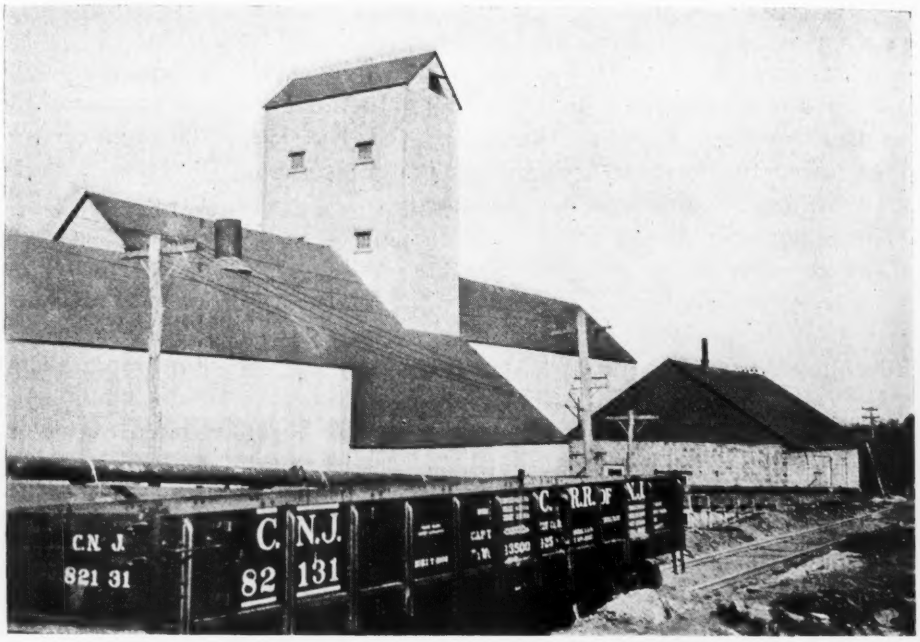
Steel and Concrete Now Being Generally Used for Sand and Gravel and Crushing Plants—New Capital Nearly All Comes from Experienced Rock Products Producers

By Edmund Shaw
Editor, Rock Products

THE editorial trip just completed included visits to the cities of Indianapolis, Columbus, Philadelphia, Wilmington, Baltimore, Washington, New York, Buffalo, Cleveland and Youngstown. In each of these, stops of several days were made and trips made to nearby towns and cities.

Especial attention was paid on this trip to the mineral aggregate industry, and a number of new plants were visited. Without exception all of these plants were being put up, or had just been put up, by men who have been in the business for many years. And they were *all* of the new plants that were learned of in the localities mentioned.

It is evident from this that the mineral aggregate industry is consolidating itself, in the military sense of the word. The cheaper and somewhat temporary structures of wood are giving place to steel and concrete. Designs are being made by engineers and not by amateurs. The people who are putting money into plants do so with a thorough knowledge of the business and with the idea of investment and not speculation. In a word, the mineral aggregate industry has arrived.



New blast sand plant of the Bennett Gravel Co. at Farmingdale, N. J. This is only one of the many improvements which this company has made recently


Dryer house and silos of the Tavern Rock Sand Co., near Millville, N. J. The company dredges the sand and washes it in a shore plant, much the same as in a sand and gravel operation

Some of the plants which illustrate what has been said have already been described in these letters, notably the Manor plant of the Charles Warner Co., near Tullytown, Penn., and the Interstate Sand and Gravel Co.'s plant at Covington, Ind. During the latter part of this trip an unusual number of new plants were visited and this letter will describe them briefly.

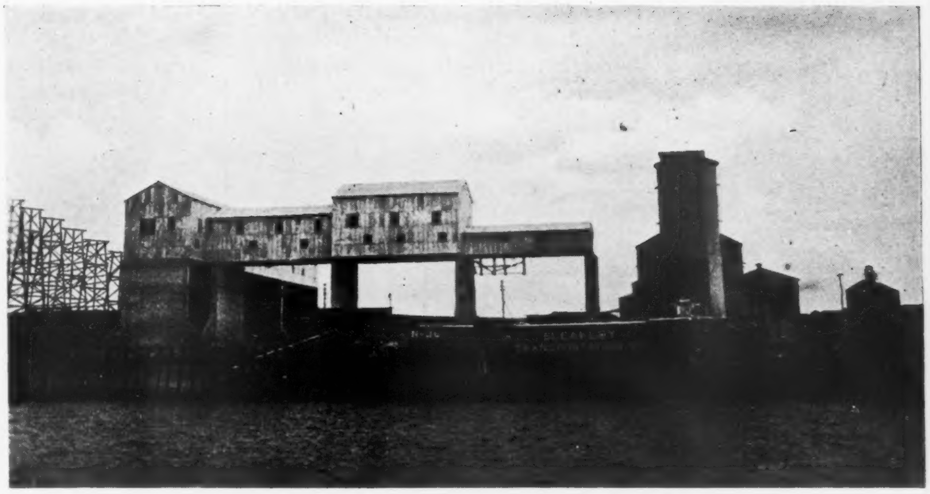
Concrete Replacing Inferior Types of Roads

Hugh Haddow drove me from his home at Rockaway, N. J., to his plant, The Menantico Sand and Gravel Co., at Millville. The trip was about 200 miles and it took in almost the length of New Jersey and almost across the state and back. It is no wonder that the aggregate industry is doing well in that state for in all the trip we were hardly out of sight of some new construction, either buildings or highway work. New Jersey has about as good highways as

any state, yet more are being built, usually to replace inferior types with better roads. These new roads are almost invariably of reinforced concrete. In the surroundings of the larger towns buildings of all sorts were going up or there were evidences that such buildings had just been completed. One would say that if building in New York and some of the other large cities is slackening, as some claim that it is, it has moved out into the smaller towns and suburbs, where it is going at full speed ahead.

New Blast Sand Plant Which Is a Model in Design and Construction

We visited the new blast sand plant of the Bennett Gravel Co. at Farmingdale which is a good example of the substantial manner in which plants are being built today. It is a fine structure of steel and concrete with red tiled roof. The concrete is mostly in the form of "Duntile," a patented concrete block made at a plant which is a subsidiary of the company at Spring Lake. This has been used for the power house and the dry house and also for the bins of the silo type which are used to hold the dried and screened sand. A considerable part of the company's product now goes into blast sand, but a great deal of it is made into aggregate for cement products and some highway material is produced, along with the regular commercial sizes of sand and gravel.



Bins and fine screening department of the Verplanck quarry of the New York Trap Corporation

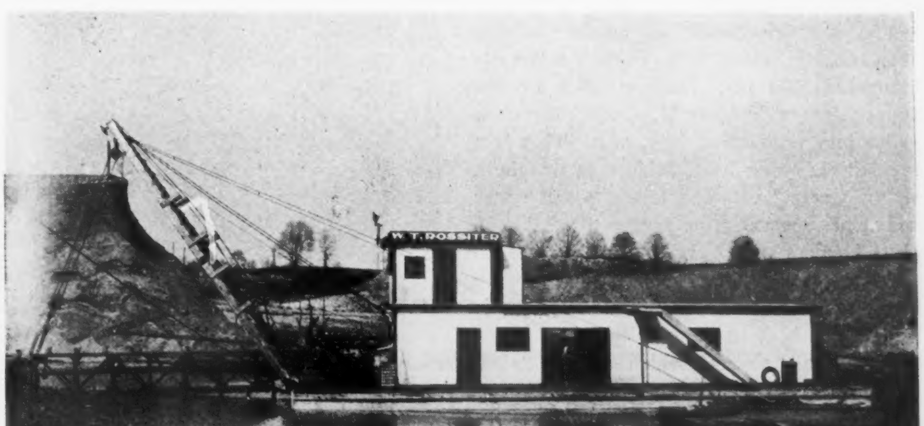
The just completed crushing plant of the General Crushed Stone Co. at Akron, N. Y.

Many improvements were being made outside of the blast sand plant, the principal one perhaps, being the installation of an electric power plant and the motorizing of all the machinery. A Fairbanks-Morse Diesel engine and Fairbanks-Morse motors make up this installation. The washing plant has been completely re-designed since the last visit of the writer and now is equipped with Hum-mer screens and Allen sand tanks. A new Northwest gas shovel and two 8-ton Plymouth locomotives take the place of the steam-driven equipment formerly used in the pit.

New Silica Sand Operation Uses a Dredge

We next visited the new silica sand plant of the Tavern Rock Sand Co., near Millville. This is another of the new plants that impresses one by its good design and substantial construction. It is of steel and concrete and has silo bins of burned clay hollow tile, the first use of such material for the purpose. This plant digs the sand with a dredge which has a 6-in. Worthington pump and General Electric motor. The washing plant is something like that of an ordinary sand and gravel plant and it is not housed in, as is customary with silica sand plants. But it contains what is almost the standard machinery for washing silica sands in eastern plants, that is Lewistown screens and sand washers.

The next new plant seen on this trip was



New dredge of the M. A. Callahan Sand and Gravel Co., Cleveland, Ohio

that of the Verplanck quarry of the New York Trap Rock Corp., near Peekskill, N. Y. This is really a wonderful plant, all steel and concrete and everything built as substantially as possible. It will be described in the next issue.

Sea-going dredge, "Weston M. Carroll," of the Niagara Sand Co., which will be the largest in the Buffalo sand and gravel trade

Three New Plants Near Buffalo

From New York City I went to Buffalo, where I saw what might be called the equivalent of three new plants. One of these, the Franklin plant of the J. E. Carroll Sand Co., was built last year, but during the winter it has been rebuilt and added to until it is practically a new plant. The screening capacity has been doubled, additions have been made to the crushing department and steel construction has been substituted for wood in the framing that holds the screens above the steel bins.

The Niagara Sand Co., another of the enterprises in which J. E. Carroll is heavily interested, was just finishing work on the hopper dredge, Weston M. Carroll, which is to go into production very soon. This is a regular sea-going boat, in fact, it was built on the Great Lakes and taken to salt water and made several trips across the Atlantic. Two hoppers which will hold about 1500 tons, have been built in the boat and a pump house added in which is a 15-in. Morris pump. The boat has a novelty in the shape of removable sluices, which can be taken out of the way when the hoppers are being unloaded by a locomotive crane. These are of Mr. Carroll's invention.

General Crushed Stone Co.'s New Plant at Akron, N. Y.

The new plant of the General Crushed Stone Co., at Akron, a short distance out of Buffalo, was fast approaching completion and should be ready to go by the time that this is published. It, too, is a remarkable plant, the more so in that it was built around what was left of the old plant in the way of foundations and crushers after the fire of last year when the plant was struck by lightning. The crushers, of course, had to be rebuilt but those foundations which were made of crushed limestone concrete were found to be quite fit for service again. The screening, conveying and motor equipment is all new, as is the building. A fuller description will be found on pages 61 to 63 of this issue.

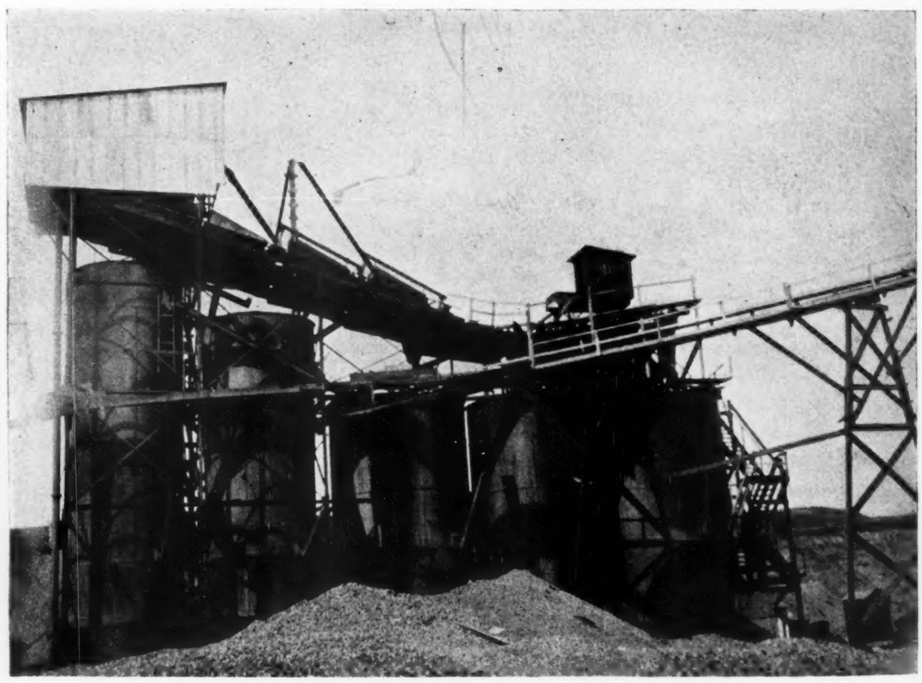
While the plant is getting ready the company is carrying on a considerable amount of work in stripping and drilling to be ready for the coming season.

At Cleveland I visited the new dredge, *William T. Rossiter,* of the M. A. Callahan Sand and Gravel Co., which, of its type, is probably the largest dredge yet built. But this is described elsewhere in this issue. This is an interesting company, as it is composed of Mr. Callahan and his four sons and it is satisfying indeed, to see so many boys carrying on the business founded by the father, and which has now grown to such an extent that it provides ample opportunity for the talents of all of them.

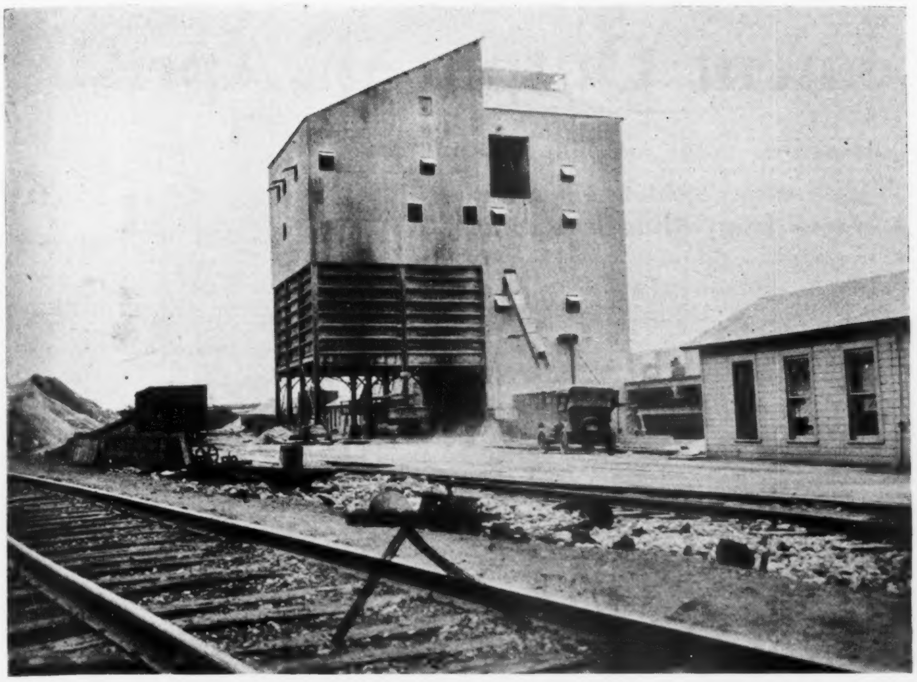
A Slag Crushing Plant That Embodies Much Experience

The last city visited was Youngstown and the trip was especially made to visit the crushing plant of the Standard Slag Co. This plant is the seventeenth plant which the Standard company has built and it is natural to suppose that it embodies the results of their long experience in building and designing plants. It was completed late last year. Practically all of the machinery was designed and built by the Allis-Chalmers Manufacturing Co. The crushing is done by a No. 7½ gyratory and a pair of heavy duty rolls. Dings magnetic separators separate the iron that comes in with the slag. There is an exceptionally well designed arrangement for feeding the plant from the receiving hopper, a series of apron feeders and a pan conveyor. Everything about this plant is steel, including the bins.

This company operates many plants for



The J. E. Carroll Sand Co.'s plant at Franklinville, N. Y., which has been rebuilt to increase capacity. Steel has largely replaced wood in the new construction



Plant of the Standard Slag Co. at Youngstown, Ohio. This is the 17th plant built by this company. It is all steel, including the bins, on concrete foundations

producing crushed slag in various parts of the United States and is carrying on a campaign for promoting the use of its products in the most commendable way; that is, by showing prospective users just what slag will do when it is used either as concrete aggregate or as material for bituminous roads. It is conducting laboratory experiments on a considerable scale and helping out its customers to use its products in the most economical manner.

In the plants that are mentioned here it is probable that about three times the capital investment per ton is represented as compared with what could have been the investment only a few years ago. The reason for this is that the men in the rock products industries have learned that substantial construction and investment in the better types of machines and equipment pay. They have also learned that their market is one that may be depended on to increase regularly, that there is no danger that "all the highways will be built pretty soon," as one used to hear remarked, and that the really extensive use of concrete is only beginning.

Reports on South Dakota's Cement Plant

HENRY STELLNER and George Adams, deputy state accountants, have gone to Rapid City, S. D., to commence the first audit of the state cement plant under the law of the last legislature providing for an auditing of the plant's books every three months. The audit will cover the first three months of 1925, the books of the plant having been audited up to January 1 upon the resignation of the former cement commission.

The state treasurer has received from Paul Bellamy, manager of the state cement plant, a check for $33,676.67, representing cash receipts of the plant from April 16 to 30. This makes a total of $96,964.53 in cash receipts of the plant turned over to the state treasurer during April.—*Sioux Falls (S. D.) Argus-Leader.*

Prize-Winners in U. S. Gypsum House Design Competition

PRIZES in the largest architects competition in small house design ever held in the United States were recently announced at the convention of the American Institute of Architects, in session in New York.

This competition in the planning of fireproof, highly insulated dwellings was conducted by the Architectural Forum of New York for the United States Gypsum Co. of Chicago, and awards of $500, $300, $200 and $100 and ten honorable mention awards of $50 each were offered in each of two classes. Class A was for five-room bungalows; Class B for two-story six-room houses, both types to be built of structolite concrete and finished with stucco, brick, stone or wood.

Prize-winners in the bungalow class, according to the *Atlantic City (N. J.) Gazette*, were: First, Angelo de Sousa, Berkeley, Calif.; second, Harrison Clark, Los Angeles, Calif.; third, Albert W. Ford, Anaheim, Calif.; fourth, P. Donald Horgan, Chicago.

Prize-winners in Class B were: First, John Floyd Ywell, New York City; second, Howard S. Richmond, Los Angeles, Calif.; third, Howard R. Hutchinson, New York City; fourth, Angus McD. McSweeney, San Francisco, Calif.

All told, 567 plans were entered, said to be the largest number ever submitted in a house designing competition in this country. The judges were: Edwin H. Brown, of Minneapolis, president of the Architects' Small House Bureau; William T. Warren, Birmingham, Ala.; F. Ellis Jackson, Providence, R. I.; Julian Peabody and Dwight James Baum of New York City.

Consulting Engineer for Rock Products Industries

HUGO W. WEIMER, formerly engineer with the Power and Mining Division of the Worthington Pump and Machinery Corp., Cudahy, Wis., and more recently assistant to the chief engineer of crushing and cement machinery department, the Allis-Chalmers Manufacturing Co., will leave the Allis-Chalmers company June 1 and establish an office at 639 Superior street, Milwaukee, Wis., as a consulting engineer, specializing in rock crushing, sand, gravel and other rock products industries. He will also be associated with Randolph-Perkins Co., engineers-managers, Chicago.

Hugo W. Weimer

Mr. Weimer was with the Worthington Pump and Machinery Corporation, Power and Mining Machinery Works, Cudahy, Wis., from 1908 to 1924 and was promoted successively from the position of designing engineer to that of sales engineer, chief estimator and field engineer. Since the Worthington company was absorbed by Allis-Chalmers in 1924, Mr. Weimer has held the position of assistant chief engineer, crushing and cement machinery department and will act in that capacity until June 1.

Mr. Weimer has been retained as consulting engineer in connection with the erection of a new plant for the manufacture of cement blocks with cinders as a base. The plant is now under construction and crushing and screening equipment will be installed for grading the cinders.

Portland Cement Output in April

With Estimates of Total Cement Output and Value, by States and Districts, and Shipments of Portland Cement from Mills Into States, 1924

THE following tables, prepared under the direction of Ernest F. Burchard of the Department of the Interior, Geological Survey, are based mainly on the reports of producers of portland cement. The April, 1925, totals include estimates for one plant. April production and shipments were the highest for that month in any year; stocks decreased slightly but were higher than ever before except at the end of March, and are equivalent to the consumption for nearly 1.4 months at the present rate.

Stocks of clinker, or unground cement, at the mills at the end of April, 1925, amounted to about 9,731,000 bbl. compared with 9,962,000 bbl. (revised) at the beginning of the month.

CAPACITY

Portland cement manufacturing capacity of the United States, by commercial districts, 1923 and 1924, in barrels.

District	Estimated capacity 1923	1924*
E'n Penn., N. J. & Md.	42,195,000	43,831,000
New York	8,306,000	9,107,000
Ohio, W'n Penn. & W. Va.	15,090,000	16,187,000
Michigan	9,346,000	11,333,000
Wis.,† Ill., Ind. & Ky.	22,296,000	23,532,000
Va., Tenn., Ala. & Ga.	10,719,000	12,889,000
E'n Mo., Iowa, Minn. & S. D.†	16,580,000	17,418,000
W'n Mo., Neb., Kans. & Okla.	11,795,000	12,277,000
Texas	4,642,000	5,048,000
Colorado and Utah	3,025,000	3,205,000
California	12,594,000	14,477,000
Ore., Wash. & Mont.	5,270,000	4,917,000
	161,858,000	174,221,000

*Subject to revision.
†Wisconsin and South Dakota first included in 1924.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN APRIL, 1924 AND 1925, AND STOCKS IN MARCH, 1925, IN BARRELS

Commercial District	Production—April, 1924	1925	Shipments—April, 1924	1925	Stocks at end of April 1924	1925	Stocks at end of March, 1925*
E'n Penn., N. J. & Md.	3,024,000	3,337,000	3,361,000	3,808,000	4,392,000	4,571,000	5,042,000
New York	656,000	731,000	613,000	771,000	1,301,000	1,232,000	1,272,000
Ohio, W'n Penn. & W. Va.	981,000	1,275,000	999,000	1,276,000	1,918,000	2,017,000	2,017,000
Michigan	615,000	868,000	679,000	865,000	888,000	1,326,000	1,323,000
Wis.,† Ill., Ind. & Ky.	1,723,000	1,957,000	1,973,000	2,140,000	2,701,000	3,555,000	3,739,000
Va., Tenn., Ala. & Ga.	886,000	1,111,000	933,000	1,134,000	755,000	682,000	706,000
E'n Mo., Ia., Minn. & S. D.‡	982,000	1,347,000	1,251,000	1,316,000	2,519,000	3,303,000	3,271,000
W'n Mo., Neb., Kans. & Okla.	895,000	1,063,000	1,036,000	1,029,000	1,124,000	1,596,000	1,562,000
Texas	404,000	405,000	463,000	451,000	337,000	295,000	342,000
Colo. & Utah	204,000	224,000	219,000	217,000	196,000	312,000	306,000
California	1,017,000	1,096,000	970,000	1,090,000	418,000	521,000	514,000
Ore., Wash. & Mont.	339,000	393,000	274,000	297,000	610,000	472,000	375,000
	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,882,000	20,469,000

*Revised. †Began producing and shipping June, 1924. ‡Began producing December, 1924, and shipping January, 1925.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1924 AND 1925, IN BARRELS

Month	Production 1924	1925	Shipments 1924	1925	Stocks at end of month 1924	1925
January	8,788,000	8,856,000	5,210,000	5,162,000	14,155,000	17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,689,000
March	10,370,000	11,034,000	8,995,000	10,279,000	18,189,000	*20,469,000
First quarter	27,746,000	28,145,000	20,138,000	21,456,000	....	....
April	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,882,000
May	13,777,000	....	14,551,000	....	16,403,000	....
June	13,538,000	....	15,036,000	....	14,903,000	....
Second quarter	39,041,000	....	42,358,000	....	....	....
July	14,029,000	....	16,614,000	....	12,319,000	....
August	15,128,000	....	16,855,000	....	10,666,000	....
September	14,519,000	....	16,827,000	....	8,404,000	....
Third quarter	43,676,000	....	50,296,000	....	....	....
October	14,820,000	....	17,160,000	....	6,073,000	....
November	13,141,000	....	10,289,000	....	8,928,000	....
December	10,435,000	....	5,506,000	....	13,913,000	....
Fourth quarter	38,396,000	....	32,955,000	....	....	....
	148,859,000	....	145,747,000	....	....	....

*Revised.

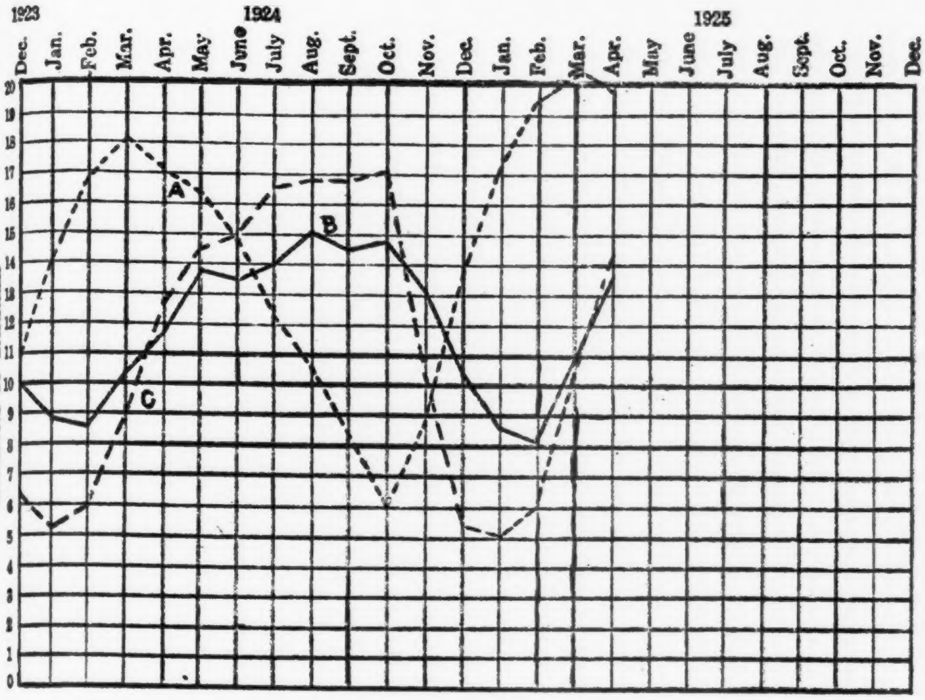
Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during February and March, 1924 and 1925:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN FEBRUARY AND MARCH, 1924 AND 1925, IN BARRELS*

Shipped to	February 1924	February 1925	March 1924	March 1925
Alabama	141,946	103,513	166,154	177,510
Alaska	0	0	132	294
Arizona	27,700	25,945	25,659	27,009
Arkansas	54,340	44,352	82,059	72,198
California	757,383	753,123	850,536	1,029,118
Colorado	65,752	69,871	58,747	102,537
Connecticut	38,283	50,026	73,917	113,668
Delaware	10,088	9,444	15,035	21,766
District of Columbia	43,695	65,176	51,768	58,474
Florida	154,556	227,811	157,704	272,094
Georgia	75,087	98,569	104,100	140,634
Hawaii	6,947	0	2,953	1,500
Idaho	20,885	11,029	16,502	17,667
Illinois	547,057	378,947	962,510	846,638
Indiana	214,900	143,464	283,594	255,597
Iowa	87,144	52,039	146,692	161,164
Kansas	88,298	120,405	124,379	212,402
Kentucky	51,025	68,970	103,672	115,222
Louisiana	91,162	97,638	110,922	98,193
Maine	10,751	5,238	22,975	21,702
Maryland	67,471	98,231	131,737	143,291
Massachusetts	98,888	134,591	188,117	257,381
Michigan	229,929	248,240	424,546	437,712
Minnesota	141,008	97,034	212,160	173,618
Mississippi	29,194	28,564	28,800	35,778
Missouri	134,634	162,992	201,370	379,157
Montana	6,443	6,093	10,033	16,450
Nebraska	49,306	46,281	78,210	99,780
Nevada	4,251	5,177	6,258	7,254
New Hampshire	15,734	15,911	27,155	27,592
New Jersey	194,146	243,534	373,059	498,227
New Mexico	16,129	10,320	16,007	18,865
New York	518,381	587,674	1,043,786	1,159,830
North Carolina	120,775	128,770	161,171	200,097
North Dakota	3,277	3,742	15,741	16,589
Ohio	317,151	271,075	501,408	592,069
Oklahoma	147,337	155,083	162,654	203,161
Oregon	63,985	60,816	90,932	103,813
Pennsylvania	387,651	421,519	641,390	808,636
Porto Rico	0	0	0	0
Rhode Island	17,657	17,908	30,219	54,083
South Carolina	43,033	73,312	49,767	72,929
South Dakota	18,052	14,528	36,289	40,697
Tennessee	69,912	87,499	104,162	116,856
Texas	231,256	345,057	295,361	381,320
Utah	20,603	16,821	30,921	28,567
Vermont	10,833	3,060	13,614	10,312
Virginia	78,029	95,942	141,142	132,891
Washington	81,153	90,669	153,249	151,814
West Virginia	54,328	56,629	72,567	85,703
Wisconsin	136,899	73,320	239,493	142,620
Wyoming	11,266	9,181	13,079	16,358
Unspecified	51,524	26,430	55,950	46,236
	5,857,234	5,961,563	8,910,357	10,205,073
Foreign countries	75,766	53,437	84,643	73,927
Total shipped from cement plants	5,933,000	6,015,000	8,995,000	10,279,000

*Includes estimated distribution of shipments from three plants for February and March, 1924; from four plants for February, 1925; and from five plants for March, 1925.



(A) Stocks of finished portland cement at factories. (B) Production of finished portland cement. (C) Shipments of finished portland cement from factories

IMPORTS AND EXPORTS*

Imports of hydraulic cement by countries, and by districts, in March, 1925.

Imported from	District into which imported	Barrels	Value
Belgium	Massachusetts	12,117	$19,483
	Los Angeles	53,033	85,929
	San Francisco	20,083	26,369
	Washington	2,341	3,327
	Total	87,574	$135,108
Canada	Buffalo	42	$122
	Washington	54	188
	Dakota	59	184
	Total	155	$494
	Porto Rico	40,052	$60,279
Denmark / France	San Francisco	6	$16
Germany	New York	6	$4
	New Orleans	3,062	3,194
	Total	3,068	$3,198
Japan	Hawaii	322	$396
Norway	Maine	3,390	$4,658
	Massachusetts	29,221	45,651
	New Orleans	12,463	22,112
	San Francisco	7,780	49,050
	Washington	11,915	18,995
	Hawaii	22,108	34,882
	Total	86,877	$175,348
	Grand total	218,054	$374,839

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN MARCH, 1925

Exported to—	Barrels	Value
Canada	1,249	$5,821
Cuba	15,190	36,368
Other West Indies	4,939	13,497
Mexico	14,150	38,303
Central America	3,779	11,617
South America	22,814	76,068
Other countries	3,127	18,736
	65,248	$200,410

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN MARCH, 1925

	Barrels	Value
Alaska	728	$2,758
Hawaii	95	270
Porto Rico	10,350	23,785
	11,173	$26,813

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision. †Imports and exports in April, 1925, not available.

International Cement Growth in Five Years

As the International Cement Corporation recently passed its fifth milestone, a review of its progress would be of interest. In November, 1919, a group of men organized the International System, with a nucleus of five mills, three of which were outside the United States. These men were not new to the industry, for their knowledge was backed by twenty or more years of active experience. Today, the system which the founded embraces five modern mills in the United States and three mills in Cuba and South America.

Since its organization in 1919, the productive capacity of the mills in the International system has increased from 2,800,000 bbl. in 1919, to 8,500,000 bbl. in 1925 or 200%.

In the five years since organization the International Cement Corporation and its subsidiaries have expended in excess of $10,000,-00 in the acquisition, modernization and enlargement of properties and have paid off all their funded indebtedness.

When organized, the International system acquired four companies with five operating plants: Argentine Portland Cement Co., Cuban Portland Cement Co., Uruguay Portland Cement Co., Texas Portland Cement Co. (2 mills).

In 1921, the Knickerbocker Portland Cement Co. at Hudson, New York, was purchased. This plant now has a capacity of 1,500,000 bbl. a year.

During 1923 and 1924, the mill of the Kansas Portland Cement Co. at Bonner Springs, Kan., was constructed and started operation in July of last year. Though in production less than a year, additional grinding machinery is now being installed, so that this mill will have a capacity of over 1,000,000 bll. of cement annually.

Construction work on the plant of the Virginia Portland Cement Corporation, the newest member of the International system, located at Norfolk, Va., is progressing rapidly. It is expected the new mill will be in operation by mid-summer.

The Virginia Corporation is entirely remodeling the property which it purchased at Norfolk, and is installing the most modern machinery for cement manufacture. Upon completion the Norfolk mill will be the most up-to-date cement plant in the South, with a capacity of over one million barrels annually. Situated on tide water, the Norfolk mill will have the advantage of water transportation rates to various points of consumption.

Included in the machinery of the mill are three large rotary kilns, each 220 ft. long, with a diameter of 10 ft. These kilns will have a capacity of 3300 bbl. of cement per day. Three concrete kiln stacks, each 200 ft. high, will be erected. Among the features of the mill will be 6 circular concrete silo-type bins, each bin measuring 32 ft. in diameter by 80 ft. high. These bins will furnish weather-tight storage for about 100,000 bbl. of finished cement.

Rates on Empty Cement Sacks Reduced in Arkansas

Effective June 1, 1925, the rates on empty, returned cement sacks between points in the vicinity of Jonesboro, Ark., will be reduced about 50%, according to A. U. Tadlock, traffic manager of the Jonesboro Freight Bureau. For instance, to Cape Girardeau, Mo., a point to which thousands of empty bags are shipped each year from Jonesboro, the rate will be reduced from 63 cents to 31½ cents.—*Jonesboro (Ark.) Sun.*

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS. IN 1924 AND 1925

	Imports				Exports			
	1924		1925		1924		1925	
Month	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
January	153,839	$250,799	229,838	$361,098	88,586	$252,497	71,596	$207,547
February	162,930	219,588	119,077	206,308	62,606	194,110	56,249	181,356
March	160,517	254,745	218,054	374,839	91,224	254,687	65,248	200,410
April	148,137	227,300	(†)	(†)	83,200	229,183	(†)	(†)
May	161,304	232,950	....	....	88,850	262,290	....	....
June	196,655	283,112	....	....	74,064	229,852	....	....
July	108,944	181,111	....	....	60,139	186,073	....	....
August	192,634	305,690	....	....	85,883	251,904	....	....
September	138,369	232,991	....	....	69,470	206,921	....	....
October	214,987	337,199	....	....	79,180	253,479	....	....
November	198,806	305,598	....	....	42,490	130,519	....	....
December	173,814	285,481	....	....	52,851	163,639	....	....
	2,010,936	$3,116,564	....	....	878,543	$2,615,154	....	....

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning May 11:

Central Freight Association Docket

10536. Crushed stone. Greencastle, Ind., to stations on the P. R. R., Greenup, Ill., to St. Elmo, Ill., inclusive. Present, $1.01 per net ton; proposed, 88 cents per net ton.

10542. Sand and gravel. Sandusky, Ohio, to Croton, Ohio. Present, $1.20 per net ton; proposed, $1.10 per net ton.

10543. Glass, loam or molding sand and sand ground from silica or pebble rock; also blast, engine or foundry sand, from Ohio and western Pennsylvania to various points. Present and proposed rates as shown below. Rates from other groups on a relative basis.

From Canton Group to	Present	Proposed
Bay City, Mich.	$3.15	$2.92
Cadillac, Mich.	4.28	3.82
Copemish, Mich.	4.54	3.82
Farwell, Mich.	4.28	3.62
Flint, Mich.	2.52	2.52
Grand Rapids, Mich.	3.15	2.92
Harbor Beach, Mich.	4.03	3.52
Lapeer, Mich.	3.15	2.52
Ludington, Mich.	4.54	3.82
Mackinaw City, Mich.	5.17	4.42
Marquette, Mich.	5.29	4.52
Michigamme, Mich.	6.05	5.02
Milwaukee, Wis. (all rail)	3.15	2.92
Petoskey, Mich.	5.17	4.42
Sault Ste. Marie, Mich.	6.05	5.40

From Coalton Group to		
Bay City, Mich.	$3.15	$2.92
Cadillac, Mich.	4.28	3.82
Copemish, Mich.	4.54	3.82
Farwell, Mich.	4.28	3.62
Flint, Mich.	.....	2.52
Grand Rapids, Mich.	3.15	2.92
Harbor Beach, Mich.	4.03	3.52
Lapeer, Mich.	3.15	2.52
Ludington, Mich.	4.54	3.82
Mackinaw City, Mich.	5.17	4.42
Marquette, Mich.	5.29	4.52
Michigamme, Mich.	6.05	5.02
Milwaukee, Wis. (all rail)	3.15	2.92
Petoskey, Mich.	5.17	4.42
Sault Ste. Marie, Mich.	6.05	5.40

10544. To publish on cement from Painesville, Ohio, to points within the following areas: Beginning at Toledo, Ohio, thence on line of N. Y. C. (O. C. L.), through Bowling Green, Galatea, Findlay, Kenton, Peoria to Columbus, inclusive; thence via Hocking Valley Ry., through Lancaster, Gallipolis to Kanauga, Ohio, inclusive; thence via N. Y. C. (O. C. L.) to Point Pleasant, W. Va.; thence via Baltimore & Ohio R. R. through Parkersburg, W. Va., Wheeling, W. Va., Washington, Penn., Pittsburgh, Penn., Butler, Penn., to Foxburg, Penn.; thence via Pennsylvania R. R. through East Sandy, Franklin, Oil City, Kinzua, Penn., Salmanca, N. Y.; thence via Erie R. R. through Dayton, N. Y., to Buffalo, N. Y.; thence via south shore of Lake Erie to point of beginning commodity rates on mileage scale basis shown in decision of Interstate Commerce Commission in Docket No. 12710 (Vol. 81, I. C. C. 1), distances to be computed on basis of the formulae prescribed therein.

10561. Cement. Speeds and Sellersburg, Ind., to Cincinnati, Ohio. Present, 10 cents (proportional); proposed, proportional rate of 9 cents.

10562. Sand (other than blast engine, foundry, glass, molding or silica) and gravel. Tecumseh, Mich., to Hand, Mich. Present, 14 cents; proposed, 30 cents per net ton.

10563. Crushed stone and screenings. Hillsville, Walford and Shaw Junction, Penn., to Wormans and Fair Grounds, Ohio, and to Lisbon, Van Fossans, Gilmore, West Point, McCurdys, Round Knob, Bridge 33, Cameron, Annesley and East Liverpool, Ohio. Present, no through commodity rates; proposed, 90 cents per net ton to Wormans and Fair Grounds (Columbiana Co.), Ohio, and $1.05 to Lisbon, Van Fossans, Gilmore, West Point, McCurdys, Round Knob, Bridge 33, Cameron, Annesley and East Liverpool, Ohio.

10568. Sand. Ottawa, Ill., District to Toledo, Ohio. Present, $2.90 per net ton; proposed, $2.65 per net ton.

10572. Crushed stone. West Columbus and quarries between West Columbus and Highway, Ohio, to Marysville, Ohio. Present, 70 cents per net ton; proposed, 60 cents per net ton.

10573. Sand and gravel. Urbana, Ohio, to Groveport, Ohio. Present, 13½ cents; proposed, 80 cents per net ton.

10574. Crushed stone and crushed stone screenings. Bluffton, Ind., to Sulphur Springs, Ind. Present, 13½ cents; proposed, 99 cents per net ton.

10575. Sand and gravel. Peru, Ind., to Valparaiso and La Porte, Ind. Present, 14½ cents to Valparaiso, Ind., and 88 cents per net ton to La Porte, Ind.; proposed, 77 cents per net ton.

10576. Sand and gravel. Ft. Jefferson, Ohio, to Cement City, Mich. Present, $1.61 per net ton; proposed, $1.13 per net ton.

10585. Coal, ashes, coal cinders and slag. Dover, Ohio, to Chili, Ohio. Present rate, 11½ cents; proposed, 80 cents per net ton.

10589. Cement. Detroit and Union City, Mich., to Canada, Montreal, P. Q., and west to and including Windsor, Sarnia and Sault Ste. Marie, Ont. Present, sixth class; proposed, 75% of sixth class.

10591. Crushed stone. Blanchard and Kenton, Ohio, to Pleasantville, Millers Siding, Rushville, Bremen, Flagdale Siding, Juncton City, New Lexington, Clay Bank, Moxahala, Rendville and Corning, Ohio. Present rates in cents per net ton:

	Present Rate From Blanchard	Present Rate From Kenton
Pleasantville, Ohio	110	110
Millers Siding, Ohio	120	110
Rushville, Ohio	120	110
Bremen, Ohio	120	120
Flagdale Siding, Ohio	120	120
Junction City, Ohio	120	120
New Lexington, Ohio	120	120
Clay Bank, Ohio	120	120
Maxahala, Ohio	140	120
Rendville, Ohio	140	120
Corning, Ohio	140	120

10594. Sand and gravel. Erie, Penn., to Buffalo and Black Rock, N. Y. Present, $1.25 to Buffalo and $1.26 per net ton to Black Rock; proposed, $1.13 per net ton.

10598. Sand and gravel. Lafayette, Ind., to stations in Indiana. Present, 70 cents to Templeton, 75 cents to Atkinson and Swanington, 76 cents per net ton; to Fowler, Gravel Hill, Earl Park and Sheff, Ind. Proposed, 63 cents per net ton to Templeton, Atkinson and Swanington, Ind., and 70 cents per net ton to Fowler, Gravel Hill, Earl Park and Sheff, Ind.

10599. Refuse, consisting of burnt molding sand, slag, ashes and cinders. Pittsburgh, Penn., to Bridgeville, Penn. Present, 8½ cents; proposed, 45 cents per net ton.

10600. Sand and gravel. Ft. Jefferson, Ohio, to Napoleon and Okolona, Ohio. Present, 16½ cents; proposed, $1.10 per net ton.

10601. Crushed stone. Bloomville, Ohio, to Baltic, Ohio. Present, 17 cents; proposed, $1.10 per net ton.

10603. Crushed stone. North Baltimore, Ohio, to Ohio. Present, to Valley Junction, $1.30 per net ton; to Cleveland, $1 per net ton and to other destinations, sixth class. Proposed, 90 cents per net ton to Milan, Spencer, Clarksfield, Smithville and Dalton, Ohio; $1 per net ton to Brewster Shops, Cleveland, Justus, Chagrin Falls, Waco and Run Junction, Ohio; $1.20 per net ton to Valley Junction (Tusc. Co.), Oneida and Minerva, Ohio; $1.30 per net ton to Sherrodsville, Sugar Creek and Del Roy, Ohio; $1.50 per net ton to Zanesville and Chili, Ohio; $1.60 per net ton to Steubenville, Yorksville and Bridgeport, Ohio.

10609. Crushed stone. White Sulphur, Ohio, to Jackson, Ohio. Present, 16½ cents; proposed, $1 per net ton.

16019. Sand, gravel and crushed stone. Kenneth and Lake Ciecott to Lydick, Ind. (M. C. delivery). Present, $1.27 per net ton (N. Y. C. delivery); proposed, $1.01 per net ton.

10620. Sand, gravel and crushed stone. Kenneth and Lake Ciecott, Ind., to Kimmel, Ind. (B. & O. delivery). Present, $1.61 per net ton on crushed stone, 15 cents on sand and gravel; proposed, $1.13 per net ton.

10626. Sand and gravel. Ginger Hills and Rupel, Ind., to Indiana, Ohio and Michigan. Present and proposed rates in cents for ton of 2000 lb.:

From Rupel and Ginger Hill, Ind.

To	Present	Proposed
Osceola, Ind.	69	65
Morehous, Ind.	70	65
Vistula, Ind.	70	70
White Pigeon, Mich.	70	70
Sturgis, Mich.	80	75
Bronson, Mich.	Class	81
Coldwater, Mich.	Class	81
Allen, Mich.	Class	81
Hillsdale, Mich.	Class	95
Pittsford, Mich.	Class	112
Clayton, Mich.	Class	112
Adrian, Mich.	Class	117
Goshen, Ind.	76	74
Ligonier, Ind.	115	75
Brimfield, Ind.	Class	75
Corunna, Ind.	Class	80
Butler, Ind.	Class	89
Mina, Ohio	Class	93
Bryan, Ohio	Class	93
Constantine, Mich.	Class	75
Three Rivers, Mich.	Class	79
Flowerfield, Mich.	Class	81
Portage, Mich.	Class	87
Comfort Siding, Mich.	Class	93
Middlebury, Ind.	80	75
Seyberts, Ind.	80	75
Findlay, Mich.	Class	75
Ft. Wayne, Ind.	Class	93
Carroll's Crossing, Ind.	Class	93
Stoners, Ind.	Class	93
St. Johns, Ind.	Class	93
Auburn, Ind.	Class	93
Pleasant Lake, Ind.	Class	93
Fremont, Ind.	Class	93
Montgomery, Mich.	Class	95
Bankers, Mich.	Class	95

Illinois Freight Association Docket

3145. Sand and gravel. Carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full visible capacity actual weight will apply but not less than 40,000 lb. From Dubuque, Iowa, to Galena, Ill. Per net ton: Present, 81 cents; proposed, 75 cents.

3157. Sand, gravel and crushed stone. Carloads, minimum weight marked capacity of car. To Hoffman, Ill., from Cairo, Metropolis, Brook, port, Rosiview, Shetlerville, Ill. Present, combination rates; proposed, $1.26 per net ton.

3143. Sand and gravel. Carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full visible capacity actual weight will apply but not less than 40,000 lb., from Chillicothe, Ill., to De Pue, Ill. Rates in cents per net ton: Present, 76; proposed, 63.

3164. Slag, crushed or ground. Carloads, minimum weight 90% of marked capacity of car, except when loaded to full visible capacity actual weight will apply. From Aurora, Ill.

To	Present	Proposed
Albany, N. Y.	47½	30½
Fulton, N. Y.	41½	28½
Philadelphia, Pa.	47½	29½
Cleveland, Ohio	25½	15½
East Walpole, Mass.	51½	33½
South Bend, Ind.	18½	11

3170. Sand and gravel. Carloads, minimum weight marked capacity of car, from Palestine, Ill., to Murphysboro, Ill. Rates in cents per net ton: Present, 176; proposed, 126.

3175. Sand, silica. Carloads, usual minimum weight, from Ottawa, Ill., district to Toledo, Ohio. Rates in cents per net ton: Present, 290; proposed, 265.

Southern Freight Association Docket

20017. Lime. It is proposed to establish a rate of 270 cents per net ton on lime, carloads, minimum weight 30,000 lb., from Calera, Graystone, Keystone, Longview, Newala, Pelham, Saginaw, Vernons and Wilmay, Ala., to Lanett, Ala., and West Point, Ga.; the rates to Lanett to be applicable on both intrastate and interstate traffic (reduction). Proposed rate, same as in effect from Calera and Newala, Ala., to Lanett, Ala.

20028. Granite or stone, crushed or rubble. Carloads, from Wake Forest, N. C., to Philadelphia, Pa. Present rate 224 cents per net ton; proposed 324 cents per net ton, which is for the purpose of correcting a clerical or typographical error.

20034. Stone, broken or crushed. Carloads,

from Ketona, Ala., to Birmingham, Ala. Present rate, 13 cents per 100 lb. (Class "A"); proposed, 5 cents per net ton, same as applicable on slag from Ensley, Ala., which is also the same as applicable on crushed stone from Dolcito, Ala.

20035. Limestone, ground. Carloads, from Dolcito, Ala., to Tupelo, Miss. Present rate, 225 cents per net ton (combination); proposed, 180 cents per net ton, based on proportion of 45 cents to Birmingham, plus rate of 135 cents per ton beyond.

20059. Sand. Carloads, from Montgomery, Jackson's Lake, Prattville Junction, Oktamulke and Coosada, Ala., to Praco, Ala. Present rate, 133⅓ cents per net ton; proposed, 126 cents per net ton, made by use of 79 cents per ton from Montgomery to Birmingham, proportional rate of 76⅔ cents per ton beyond, minus Agent Jones' Combination Tariff deduction of 30 cents.

20074. Sand. Carloads, minimum weight, 40,000 lb., from Hunter and Cardens Bluff, Tenn., to Keenburg, Tenn. Present rate, 90 cents; proposed, 68 cents per net ton, same as current rate to Bluff City, Tenn.

20084. Cement. Carloads, from Southern producing points to stations on the North Wilkesboro Branch of the Southern Ry., Rural Hall, N. C., to North Wilkesboro, N. C., inclusive. It is proposed to establish the following rates which represent reductions: From Birmingham, Boyles, North Birmingham, Leeds, Ragland, Ala., Chattanooga and Richard City, Tenn., 26 cents; Portland and Rockmart, Ga., 25 cents; Spocari, Ala., 28½ cents per 100 lb. Proposed rates made with relation to other points in the same general territory.

20107. Sand and gravel. Straight carloads, from Owensboro, Ky., to Madisonville, Ky. Present rate, 7 cents; proposed, 5 cents per 100 lb., made in line with rates between other points on the L. & N. R. R. for similar distances.

20128. Stone, crushed. Carloads, minimum weight 40 net tons from River Front Extension, Tenn., to Knoxville, Tenn. Present rate, 4½ cents per 100 lb.; proposed, 45 cents per net ton (intrastate only), same as in effect from South Knoxville Extension to Knoxville.

20136. Sand and gravel. Carloads, from Lilesville and Pee Dee, N. C., to Fort Mill, S. C. It is proposed to reduce present rates to be 122 cents per net ton. From Lilesville, rate is made by use of the proposed Georgia joint line scale, reduced 10% for the continuous distance of the S. A. L. Ry. and So. Ry. via Charlotte, with rate from Pee Dee same as from Lilesville.

20169. Cement. It is proposed to establish rates on cement, carloads, to A. C. L. R. R. stations west of Spring Hope, N. C., viz., New Hope, Barhams, Bunn and Rolesville Quarry, N. C., from Eastern cities. Fordwick, Va., Virginia cities and Southeastern points to be the same as to Spring Hope, N. C., in lieu of combination.

20190. Lime. It is proposed to establish the same rates on lime, carloads, from Landmark, Ala., to Louisiana destinations as applicable from Wilmay, Ala., to apply in lieu of Wilmay, Ala., combination.

20281. Gravel. Carloads, from Columbus, Miss., to Leakesville, Miss. Present rate, 194 cents per ton (combination); proposed, 167 cents per net ton, based on the proposed Georgia joint line scale, reduced 10%.

20283. Stone, broken or crushed. It is proposed to establish on stone, broken or crushed, carloads, a rate of 5 cents per 100 lb. from Madison, Ky., and Sunlight, Ky., to Owensboro and 5.4 cents per 100 lb. from Russellville, Ky., to Milan, Tenn., and observe this rate as maximum to the extent commodity rates are now published at intermediate points of origin and destination. Proposed rates are made on basis usually employed for rates on this material between points on the L. & N. R. R.

20286. Lime. Carloads, from Mt. Vernon, Ky., to Cincinnati, Ohio, Covington and Newport, Ky. Present rate, 300 cents; proposed, 230 cents per net ton, made with relation to present rate from Pine Hill, Ky.

20309. Molding sand. It is proposed to establish a rate of 22½ cents per 100 lb. from Cincinnati, Ohio, Covington, Newport, Lexington and Frankfort, Ky., and 20½ cents per 100 lb. from Louisville, Ky., Jeffersonville and New Albany, Ind., to New Orleans, La., on molding sand, carloads, these rates being the same as now in effect to Gentilly, La., and to apply in lieu of combination rates.

20318. Cement. Carloads, from Ordwick, Va., to Camilla and Pelham, Ga. Present rate, 69 cents; proposed, 25 cents per 100 lb., same as rate in effect to Thomasville, Ga., which is the basis recently authorized from Kingsport, Tenn., and other Southern cement producing points.

20329. Granite or stone, crushed or rubble. Carloads, from Greystone, Ga., to West Palm Beach, Fla. Present rate, 441 cents; proposed, 394 cents per net ton, same as current rate from Mt. Airy, N. C., to West Palm Beach, Fla.

2032. Sand. Carloads, minimum weight marked capacity of car, except where loaded to full visible capacity actual weight will govern, from Memphis, Tenn., to West Point, Miss., and Starkville, Miss., Aberdeen, Miss., combination now applies. Proposed, 120 cents per net ton, which is for the purpose of meeting competition at Mississippi producing points.

20353. Sand, gravel, etc. It is proposed to revise interstate rates on sand, gravel, crushed stone and slag to and from points in Georgia so as to be not lower than the scale prescribed by the Georgia Service Commission on February 25 for application between points within the state. Copy of statement showing present and proposed rates will be furnished upon request.

20363. Lime. It is proposed to establish rates on lime, carloads, from Adams and Erin, Tenn., to Mississippi Valley points to apply in lieu of Nashville, Tenn., combination, the proposed rates being: To Ellisville, Laurel and Meridian, Miss., $3.72; Hattiesburg, Miss., $3.80; Natchez, Miss., $3.80; to Jackson, Tenn., from Adams, $2.70, from Erin, Tenn., $2.37 per net ton.

20367. Sand and gravel. Carloads, from Century, Tarzan, Fla., Flomaton, Berrylum and Osaka, Ala., to Manistee & Repton R. R. stations. Present rate, combination; proposed rate, 120 cents per net ton, made by use of factor of 90 cents to Manistee Junction, Ala., plus proportion of 30 cents per ton beyond.

Southwestern Freight Bureau Docket

4444. Cement. To provide rule permitting stopping in transit at directly intermediate points in Texas to partly unload shipments of cement from points in Oklahoma, Kansas and Missouri to points in Texas at an additional charge of $6.30 per car per stop. It is stated that stopping in transit privileges to partly unload shipments of cement have been established at points in Arkansas and Louisiana and it is proposed to establish this privilege at points in Texas on intrastate traffic. This places the interstate manufacturer on an unequal footing with manufacturers of cement within the state of Texas.

4454. Gravel. To establish a rate of 29½ cents per 100 lb. on gravel carloads, minimum weight as per item No. 4404A of S. W. L. Tariff No. 15L, from Winona, Minn., to Blackwell, Okla. Shippers request the establishment of the same rates on gravel from Winona, Minn., as are applicable on sand from Red Wing, Minn., the present class basis being prohibitive.

4568. Crushed rock. To amend Item No. 316A of S. W. L. Tariff No. 55G, naming rates on chatts, stone, etc., from and to points in Oklahoma to include crushed brick. It is stated that the value of crushed brick is as low or lower than that of crushed rock, chatts and gravel, and that it is used for exactly the same purposes as the latter mentioned commodities. It is, therefore, desired to establish the same rates.

4592. Lime. To establish same rates on lime, carloads, minimum weight 30,000 lb., from Landmark, Ala., to points in Louisiana shown in Agent Speiden's Louisiana Tariff No. 96B as in effect from Wilmay, Ala. It is stated that Landmark, Ala., is located on the L. & N. R. R. between Birmingham and Calera, Ala., less than one mile south of Wilmay, Ala. It is, therefore, desired to establish same rates as now applicable from Wilmay, Ala.

4593. Chatts, gravel, etc. To establish a rate of 12½ cents per 100 lb. on chatts, gravel, sand and tailings, carloads, as described in Santa Fe Tariff No. 11232D from Joplin, Mo., to Buffalo, Okla. It is stated that the present class basis is prohibitive and that the proposed rate is the same as now carried to Shattuck, Okla.

Western Trunk Line Docket

3545-H. Sand and gravel. Carloads, from Kansas producing points and other sand loading tracks in the Kansas City, Mo., switching district, named in W. T. L. Tariff 156L to industrial and team tracks on K. C. C. C. & St. J. Ry. in Kansas City, Mo.-Kan. Present, no through published rates; proposed, same rates as are applied to industrial and team tracks on other roads in Kansas City, Mo.-Kan. Minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will apply. In no case shall the minimum weight be less than 40,000 lb.

262-C. Limestone, crushed or ground. Carloads, from Mosher and Ste. Genevieve, Mo., to St. Paul, Minneapolis and Minnesota, Transfer, Minn. Present rate is made up of commodity rate of $1.10 per ton to St. Louis, plus Class E from St. Louis to the Twin Cities of 20½ cents; proposed, $3.25 per ton. Minimum weight 90% of marked capacity of car, except when actual weight, loaded to full, visible capacity is less actual weight will govern, but not less than 40,000 lb.

4554. Sand and gravel. Carloads, from Louisville, Neb., to Atchison, Kan., 7 cents per 100 lb.; Kansas City, Mo., 12½ cents per 100 lb.; Leavenworth, Kan., 7½ cents per 100 lb., and St. Joseph, Mo., 12½ cents per 100 lb. Proposed, 7 cents per 100 lb. Minimum weight 90% of marked capacity of car, except when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb.

2051-K. Stone, crushed. Carloads, from Quartzite, Minn., to Tilden, Neb. Present, 5½ cents to Sioux City, plus 9 cents to Nebraska, distance scale beyond; total through 14½ cents. Proposed, 11½ cents per 100 lb. Minimum weight 90% of marked capacity of car, except when loaded to full visible capacity and weight is less than 90% of marked capacity, the actual weight to apply, but in no case shall the minimum weight be less than 50,000 lb.

Pennsylvania Sand and Gravel Rates Lowering Up to Interstate Commission

A DOWNWARD revision of rates on sand and gravel has been proposed by Examiner Cheseldine in No. 15329, Pennsylvania Sand and Gravel Producers Association, et al, vs. Baltimore and Ohio, et al.

The tentative report is the result of a complaint filed by several western Pennsylvania sand and gravel producers during October, 1923. The hearing thereon was held at Pittsburgh on March 24, 25 and 26, 1924. The following is quoted from the Examiner's proposed finding:

Generally speaking, there is no transportation reason why the rates on sand and gravel should be higher than the rates on slag or crushed stone. In most territories, and in the states, they are given the same rates, and where the commission has prescribed scales in any territory on all of them they have been rated the same. The rates complained of, considered as a whole, are clearly too high.

The commission should find that defendants' rates on sand and gravel, in carloads from complainants' shipping points in western Pennsylvania to destinations in Ohio, New York and West Virginia, are, and for the future will be, unjust, unreasonable and unduly prejudicial, to the extent that they exceed the rates contemporaneously maintained on slag and crushed stone, in carloads, from and to the same points, subject to the application of the following scales as a maximum for single-line hauls, 20 cents per ton to be added for joint-line hauls, distances to be computed over short-line routes where composed of one or more carriers.

Distance (Miles)	Rate (Cents)
20 and under	60
40 and over 20	70
60 and over 40	80
80 and over 60	90
100 and over 80	100
125 and over 100	110
150 and over 125	120
175 and over 150	130
200 and over 175	140

If this report is approved by the Interstate Commerce Commission in their final decision, it will not only give producers in that territory a much lower basis of rates on sand and gravel but will remove the discriminations which have heretofore existed, on account of lower rates being published on commercial slag from and to points in that vicinity.

Western Pennsylvania producers started this fight back in 1920 by the filing of a formal complaint with the Pennsylvania State Commission. They again introduced testimony in the complaint of the National Sand and Gravel Association vs. Pennsylvania Railroad 74 I. C. C. 615 without success. Later a petition was filed with the Pennsylvania state commission to reopen the former state complaint which was opposed by the railroads at that time, they using the argument that state rates could not be adjusted because of the rates on interstate traffic. The present interstate case was then instigated which, when finally decided may open the way for an adjustment of the Pennsylvania state situation.

Complete Improvements at Portsmouth, Ohio, Gravel Plant

THE Portsmouth Sand and Gravel Co. has completed the improvement of its plant at the foot of Third street, Portsmouth, Ohio, according to the *Portsmouth (Ohio) Sun*. The improvements consist of a pier on the river bank; a dredge, equipped with a 10-in. centrifugal pump and screening apparatus; an American derrick for unloading barges; a tow boat, equipped with semi-diesel engines; four barges; storage bins and storage track, which provides for 40,000 yd. of storage.

The sand and gravel is washed and graded on the dredge and loaded into the barges which are unloaded at the landing along the Scioto river by the derrick. The material is transported to the bins by a cableway and from the bins it is loaded into railroad cars or trucks.

The company has recently completed a new road to the plant, which will greatly facilitate truck delivery. The plant has a capacity of 1000 yd. per day and was built under the supervision of Charles I. King, vice-president of the company and superintendent of river operations.

First Safety Council of Ohio Quarrymen

THE first Quarry Safety Council meeting in Ohio was held at Toledo on April 29. About 40 quarrymen, state officials and representatives of manufacturing and insurance companies and railroads were present. Edward E. Evans of the Whitehouse Stone Co. and president of the Ohio Macadam Association was chairman.

Proper methods of handling dynamite were illustrated by movie films. Questions were asked and answered regarding the promotion of safety work among the employes of a quarry. An excellent idea advanced by the chairman was that a Safety First group meeting should be held at the next convention of the National Crushed Stone Association.

From the standpoint of economy alone, safety work is bound to pay, as was brought out in the discussions on insurance rates. Rates are bound to be lowered with a better experience record.

Missouri Valley Association's Semi-Annual Meeting

THE regular semi-annual meeting of the Missouri Valley Association of Sand and Gravel Producers will be held at Topeka, Kans., on May 25 at the Hotel Kansan. Otto Kuehne, Jr., of the Kansas Sand Co., chairman of the entertainment committee, will make reservations for intending visitors.

Loss of the Dredge "Kelley Island"

THE sea-going hopper dredge, *Kelley Island*, capsized May 2 off Point Pelee, in Lake Erie, drowning Capt. W. G. Slackford and 8 members of the crew of 16.

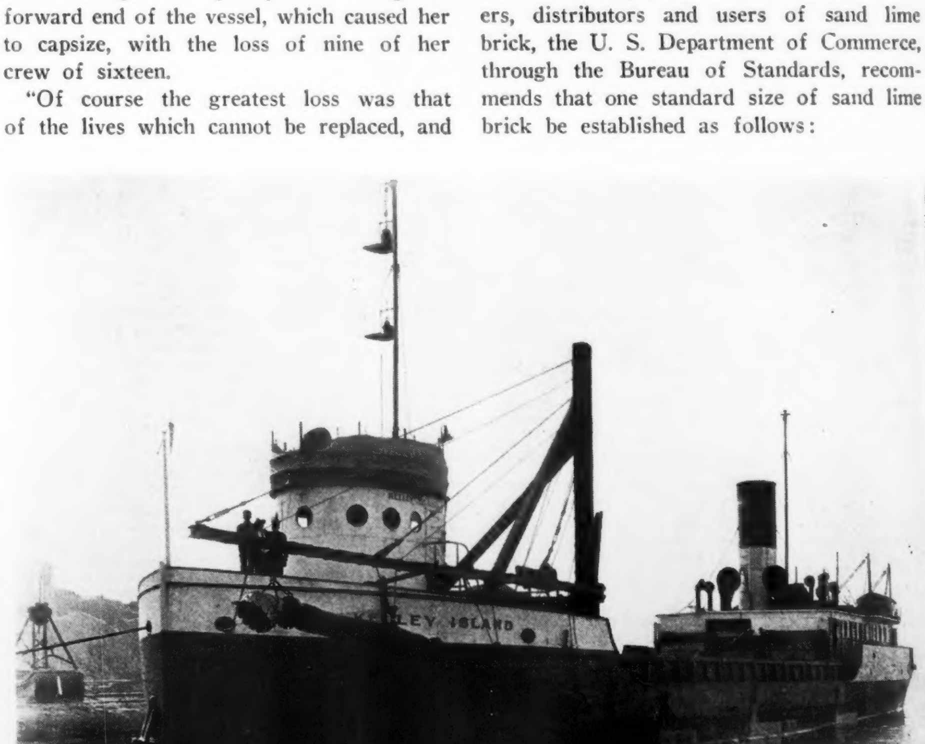
The *Kelley Island*, one of the best sandboats on the lakes, was a steel steamer, equipped with watertight compartments, and was 185 feet long, 38 feet wide and drew 14 feet. She was of 881 registered tons. Built in Lorain, Ohio, in 1914, she had carried more than 2000 loads of sand without an accident.

In reply to a letter from ROCK PRODUCTS the Kelley Island Lime and Transport Co., to whom the boat belongs, has written as follows:

"Investigations conducted by the insurance people and also by the United States Local Inspectors would indicate that certain watertight bulk heads which are supposed to be closed off each time the suction hose is disconnected and swung inboard, on this occasion for some reason or other, probably due to oversight or carelessness of the member of the crew in charge of that work, were not closed. Heavy seas came through the open port, flooding the forward end of the vessel, which caused her to capsize, with the loss of nine of her crew of sixteen.

"Of course the greatest loss was that of the lives which cannot be replaced, and while the boat can undoubtedly be salvaged, the company will sustain a monetary loss as it was insured for considerably less than her value, owing to our great faith in her seaworthiness and the limited trade in which she was engaged and this belief was evidently shared by the crew, as evidenced by their neglect in carrying out instructions to use every safety measure."

The Kelley Island Lime and Transport Co. maintains a considerable fleet on the lakes for transporting lime, limestone, sand and gravel, crushed rock and the like. Six of these vessels are "sand suckers" of much the same type as the *Kelley Island*.



The dredge "Kelley Island," which capsized in Lake Erie

Two New Sand Dredges Near Cleveland

TWO new sand dredges are being installed near Cleveland, Ohio, in the locality near Stop 3 on the electric road that runs to Akron. One of these is being built by the Cuyahoga Sand Co., the other by Lidell Bros. Both have 10-in. pumps. The Broadway Sand and Gravel Co., in the same section, has moved its plant and dredge to the other side of the highway from the ground which it formerly worked and has made a number of improvements.

Simplified Practice Recommendation on Sand Lime Brick

IN accordance with the unanimous action of February 3, 1925, of the general conference of representatives of manufacturers, distributors and users of sand lime brick, the U. S. Department of Commerce, through the Bureau of Standards, recommends that one standard size of sand lime brick be established as follows:

Type	Length	Thickness	Width
Sand lime brick	8 in.	2¼ in.	3¾ in.

This recommendation is to become effective July 1, 1925, subject to annual revision by a similar conference.

GEORGE K. BURGESS,
Director, Bureau of Standards.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Combatting Dishonest Concrete Blocks

Egbert Concrete Products Company Builds Up a Big Business by Making Only "Quality" Products

THE Egbert Concrete Products Co. has a plant in Brooklyn, and another at Nicetown, N. Y. Geo. W. Egbert, the principal owner is president of the Brooklyn Concrete Products Association.

It has been estimated that there are 350 concrete block plants in New York City. Many of these are small back-yard affairs and their product is only to be called a concrete block through courtesy. Cement content in such blocks is kept down to the point where it will hold the aggregate together long enough to allow the block to be delivered and laid and no more.

Mr. Egbert was a real estate man and got into the block business through acquiring part ownership in a plant in a real estate transaction. He got interested, decided the business was worth developing and that it offered an excellent field of effort, both in a business and a mechanical way, and built up the business to its present considerable state. Now he and his associates are shortly to build a third plant which will probably embody all that he has learned in the construction and operation of the two.

Poor Block Competition an Obstacle to Success

He found the principal obstacle to success in the business was the competition of poorly made block. Of course, there were other men like himself who wanted to make and sell only an honestly made block and he got them together and formed an association to combat bad block competition. The "powers that be" in Brooklyn did not receive the association with much enthusiasm at first but they were fair. An inspector was secured and a truck hired and samples of block were taken from 100 building operations which were going on in Brooklyn. Sixty-eight of these fell below the standard required for block by the New York building code when tested at Columbia University and other laboratories. Twenty-three of them showed a compres-

All of the Association members' blocks bear name and Association mark

Plant, office, and curing yard of the Egbert Concrete Products Co., Brooklyn, N. Y.

sive strength of 300 lb. or less. All of the blocks made by members of the association, of course, showed strengths in considerable excess of the code's requirements and the knowledge of these facts was a great boost for the association members' products in building circles.

Now every block made by a member of the association is marked with the maker's name and carries the association's mark as well. This is a guarantee to the buyer that blocks are made to fill the code requirements and also that the output of the factory is regularly inspected and tested. Code requirements in strength are 700 lb. to the square inch in compression. Mr. Egbert's blocks have always tested from 1200 to 1500 lb. and other members of the association produce blocks equally good.

A handsome block faced with crushed spar

The Egbert plant which was visited by ROCK PRODUCTS, is near 41st Street and Glenwood Avenue in Brooklyn. There are a number of concrete block plants in this locality, in which building has been heavy for the past two or three years.

The plant produces its own aggregate. The pit is right by the plant and a 1-yd. Green scraper bucket draws the sand to the foot of an elevator which lifts it to a 14-ft. revolving screen. This screen is to separate trash and oversize. The undersize, which might be described as an ordinary concrete sand with some small pebbles, falls into a bin from which it is fed to the mixers. No other aggregate is used.

The scraper bucket is drawn in and out by a special Mundy electric hoist which has a speed of 400 ft. a minute under load and of 600 ft. a minute on the return trip.

Automatic Measuring of Aggregate and Water

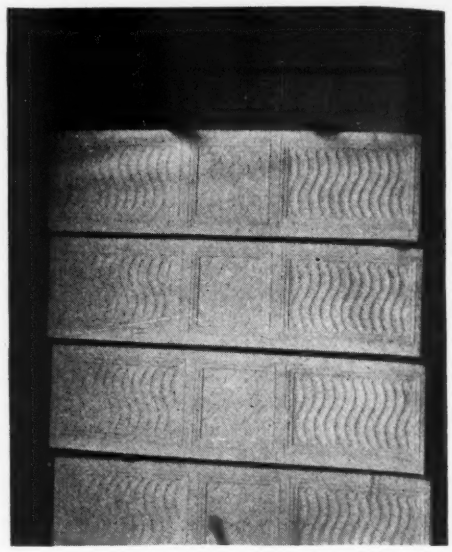
The aggregate is carried from the bin to two Besser mixers by an automatic bucket. This is hung on a monorail and can be run in either direction. The mixer man pulls a lever above the mixer and the bucket runs over to the bin, fills itself to exact volume and returns to its position above the mixer automatically. The only variation in the amount of aggregate used is that coming from differences in moisture content and a different bulking, but the moisture content varies so little that this can be disregarded.

Cement and water are also accurately measured, the first by the bags used and the second by an automatic water tank above the mixer. This automatically fills itself to a certain point and then the water is shut off by a pressure valve. The water is added all at once after the material has been mixed dry.

A 15-Minute Dry Mix

Now comes one of the unusual features of the process, the long dry mix. It lasts 15 minutes, and this time is not the result of a whim or a guess but one which has been worked out by experiment as necessary to give the greatest strength for the amount of cement used and this particular aggregate. After the water has been added the mixers are run long enough to insure that the water is fully distributed throughout the charge and then the mixers are dumped to the machines.

There are two of these; Besser automatic power tamping block machines.

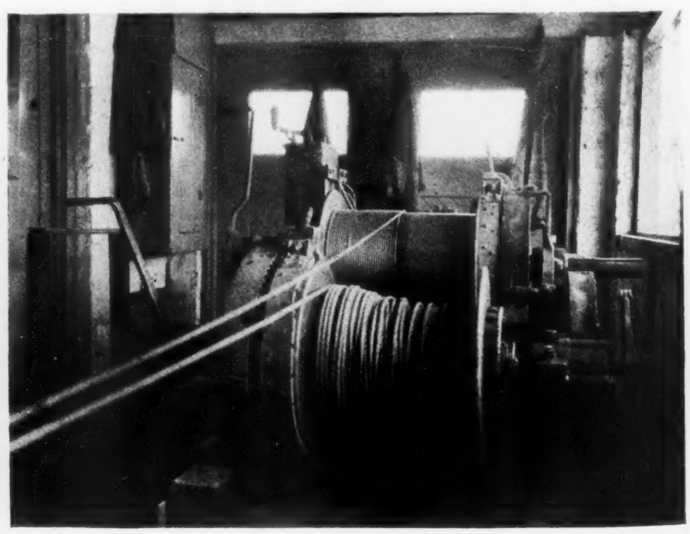


Trim stone molded by electric tamping machine

The mixture is very plastic and the blocks as they come from the machine are "rubbery." They go to the steam curing rooms by the usual system of parallel tracks and transfer trucks.

The steam curing rooms or kilns have steam pipes in water troughs and the room is filled with a fog of wet steam from these. No temperature readings are made but the temperature appears to be about that of a warm room.

Mr. Egbert does not believe that it is



Left—Aggregate is drawn from the pit to the plant elevator by a scraper bucket. Right—Two-speed electric hoist for handling the scraper

safe to take blocks from the curing rooms to the job, as the writer has seen done in Philadelphia. He cures them in the yard for at least two weeks during which time the blocks are kept wet by automatic sprinklers.

The tracks from the curing rooms are set so that there is just space enough to pile blocks which are taken from the curing rooms on one side and for trucks to drive in and load the blocks. Hence the blocks are unloaded in the yard and loaded on the trucks with the minimum of handling.

Faced blocks are made. Very handsome ones are given a facing of crushed Crown Point spar. Mica is used on some of them. But the heaviest demand is for the standard block and for the solid block which the building code requires for foundations which are below water level. It is said that these solid blocks are made in no other part of the United States as a regular product.

In making faced block the facing mixture is made in a small mixer set on the same floor as the regular mixers, but fed from sacks by hand.

Trimstone and garden ornaments are made in considerable amount. The material is white cement and crushed marble and the mixture is not poured but is tamped into the mould with an electric tamper. The mould is held in a special machine invented by Mr. Egbert and patented by him. The results of this method of working are astonishingly good.

A photograph of some pieces of trim is reproduced here but it does not begin to do justice to the sharp clean moulding and the beautiful texture of the face. An interesting novelty in this sort of product is a window box that is combined with a block so that it can be built into the wall.

Although the plant is near the greatest city, with all its facilities for having repair work done quickly, Mr. Egbert finds it profitable to have a well equipped machine shop at the plant, with two lathes, drill presses, welding outfit and the like. The time saved by being able to make repairs has paid the cost of this machine shop many times over.

The measuring arrangements for mixing and many other new things about the plant are all Mr. Egbert's inventions and in several cases he has covered them with patents. He is working out new ideas, one of which, shown to the Rock Products man on his visit is an automatic device for washing and cleaning faced block.

It is inspiring to visit a plant of this kind. This is not only because of the ingenuity and efficiency that are displayed in the process, it is more because of the knowledge that the business has been built up by devotion to making a "quality" product and that in the face of cheap and dishonest competition.

Ohio Building Code Gives Recognition to Cement Products

HOUSE BILL No. 319 has become law in the state of Ohio.

This bill amends 50 sections of the present law regulating the construction of buildings in Ohio, and applies directly only to theaters, assembly halls and school buildings. However, Part 3 of this bill, under the heading of "Standard Devices," is intended to apply to a revision of the law affecting the various types of building such as churches, asylums, hospitals, homes, hotels, lodging houses, apartments, tenement houses, clubs, lodge buildings, workshops, factories, mercantile establishments and public garages.

Under the part "Standard Devices," there are two types of wall construction: (1) Standard fire walls and fire stops, (2) fire division walls and fireproof walls and ceilings.

Standard fire walls and fire stops must be constructed of brick, and shall be not less than 12 in. in thickness, or of monolithic concrete not less than 8 in. thick.

Fire division walls and fireproof walls and ceilings shall be of the following construction:

Exterior bearing walls shall be of masonry construction not less than 12 in. in thickness, and exterior non-bearing walls shall be of masonry construction not less than 8 in. in thickness except where standard fire walls are required.

Interior bearing walls shall be of masonry construction not less than 12 in. in thickness, and interior non-bearing and partition walls in fireproof buildings shall be of incombustible materials.

Fireproof floor construction shall be of any type in which all structural parts carrying weights or resisting strains are composed entirely of incombustible materials with all metallic structural members protected from the effects of fire and water by a covering of materials entirely incombustible and slow heat conductors.

Further in this bill it provides that concrete building units shall be standard load bearing concrete brick, concrete tile or concrete hollow or solid block. The average ultimate strength of concrete building units exposed to soil or weather shall be not less than 1000 lb. per sq. in. of net area in compression. The same applies to concrete building units not exposed to soil or weather, or where protected by a suitable waterproof covering material shall not be less than 700 lb. per sq. in. of gross area in compression and 1000 lb. per sq. in. of net area in compression. Concrete building units exposed to soil or weather, and not protected by a suitable waterproof covering material, shall have an absorption of not to exceed 10% by weight. The 1000 lb. test will allow 120 lb. per sq. in gross area allowable working stress. The 100 lb. will allow 90 lb. allowable working stress.

This bill does not give everything the cement products industry petitioned the Board of Building Standards for, but in the theaters, assembly halls, school buildings, the type of buildings which the inspection of the Division of Factories and Workshops places the most important because of the large number of people involved, about 90% in the construction of these types of building, the division fire walls are allowed. One of the places where the standard fire wall is specified is around heater rooms.—*Concrete Products News* of the Ohio Concrete Products Association.

Simplified Practice Recommendation on Concrete Units

IN accordance with the general conference of representatives of manufacturers, distributors, and users of concrete blocks, building tile, and bricks held in Chicago, October 16, 1924, the United States Department of Commerce, through the Bureau of Standards, recommends that the number of sizes of these units be reduced to the following:

TABLE 1.—CONCRETE BLOCKS

Height Inches	Tolerance Inch	Width Inches
7¾	Minus ⅛	6
7¾	Minus ⅛	8
7¾	Minus ⅛	10
7¾	Minus ⅛	12

Tolerance Inch	Length Inches	Tolerance Inch
Minus ¼	15¾	Minus ⅛
Minus ¼	15¾	Minus ⅛
Minus ¼	15¾	Minus ⅛
Minus ¼	15¾	Minus ⅛

TABLE 2.—CONCRETE BUILDING TILE*

	Inches	Inches	Inches
Load bearing	5	3¾	12
	5	8	12
	5	12	12
Partition	3	12	12
	4	12	12
	6	12	12
	8	12	12
	10	12	12
	12	12	12

*Not more than 3% permissible variation over or under for dimensions covering height, width, or length. The number of cells and weight per tile not considered at this conference.

TABLE 3.—CONCRETE BRICK

Types	Height Inches	Width Inches	Length Inches
Face and common	2¼	3¾	8

These recommendations are to become effective June 1, 1925. Subject to regular annual revision by a standing committee of the conference.

GEORGE K. BURGESS,
Director, Bureau of Standards.

Next Year's Cement Products Convention at Cleveland

THE 1926 annual convention of the National Concrete Products Association will be held in Cleveland, Ohio, in January. H. W. Conway, secretary-treasurer of the Cleveland Concrete Products Association, was active in getting the national convention, and will be, we presume, chairman of the local convention committee. W. H. Carey, Wisconsin Rapids, Wis., is president of the National Concrete Products Association, and Bert Carey, Forest Park, Ill., is secretary.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30 per net ton all sizes					
Chaumont, N. Y.	1.00	......	1.75	1.50	1.50	1.50
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	1.30	......
Northern New Jersey	1.60	1.80	1.80	1.40	1.40	......
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	......
Watertown, N. Y.	.50	......	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.85	......	1.85	1.75	......	......
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.10	1.20	1.20	1.00	1.05	1.05
Chicago, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Columbia, Krause, Valmeyer, Ill.	1.20	1.20	1.20	1.10	1.10	1.10
Cypress, Ill.	1.25	1.15	1.10	1.10	1.10	1.10
Dundas, Ont.	.70	1.05	.90	.90	.90	.90
Gary, Ind.	1.00	1.37½	1.37½	1.37½	1.37½	1.37½
Greencastle, Ind.	1.30	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.95	.95	.95
Northern New Jersey	1.30	......	1.80	1.60	1.40	......
River Rouge, Mich.	1.00	1.10	1.10	1.10	1.10	1.10
Sheboygan, Wis.	1.10	......	......	1.10	1.10	......
St. Vincent de Paul, P. Q.	.85	1.35@1.45	1.00@1.10	.95@1.00	.90	1.00
Stone City, Iowa	.75	......	1.20†	1.10	1.05	......
Toronto, Ont.	1.60	1.95	1.80	1.80	1.80	1.80
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
Wisconsin Points	.50	1.00	......	.90	.90	......
Youngstown, Ohio	......	......	......	1.50	1.60	1.60
SOUTHERN:						
Alderson, W. Va.	.60	1.60	1.60	1.50	1.40	......
Bridgeport and Chico, Texas	1.00	1.35	1.25	1.25	1.20	1.10
Cartersville, Ga.	1.75	1.50	1.50	1.35	1.35	......
El Paso, Texas	1.00	1.00	1.00	1.00	1.00	......
Ft. Springs, W. Va.	.60	1.60	1.60	1.50	1.40	......
Graystone, Ala.	Crusher run fluxing stone, 1.00 per net ton					
Olive Hill, Ky.	1.00	1.00	1.00	1.00	1.00	1.00
Rockwood, Ala.	1.00	......	......	1.25	1.00	......
WESTERN:						
Atchison, Kans.	.25	2.00	2.00	2.00	2.00	1.60‖@1.80
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.25	......	1.25	1.25	1.00	......
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65
Rock Hill, Mo.	1.55	1.15	1.15	1.15	1.10	1.10

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	......
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	......
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
New Haven, Wallingford and Britain, Conn.	.60	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.50@1.75	2.00@2.25	1.50@1.80	1.40@1.70	1.40@1.60	......
Oakland and El Cerrito, Calif.	1.75	1.75	1 75	1.75	1.75	......
San Diego, Calif.	1.45	......	1.65	1.30	1.30	1.25
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	......
Springfield, N. J.	1.70	2.10	2.00	1.70	1.60	......
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.—Granite	1.50	1.60	1.35	1.25	1.25	1.00
Coldwater, N. Y.—Dolomite	1.50 all sizes					
Columbia, S. C.—Granite	.50	2.00	1.75	......	1.60	......
Eastern Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.	.75	......	1.75b	1.25	1.25	......
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	......
Middlebrook, Mo.—Granite	3.00@3.50	......	2.00@2.25	2.00@2.25	......	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	......
Richmond, Calif. (Basalt)	.75*	......	1.50*	1.50*	1.50*	......

*Cubic yd. †1 in. and less. ‖Rip rap per ton. (a) Sand. (b) To ¼ in.

Agricultural Limestone

(Pulverized)

Alton, Ill. — Analysis, 97% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh		6.00
Pulverized		1.85
Asheville, N. C. — Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk		2.75
Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)		5.00
Cape Girardeau, Mo.—Analysis, 93.5% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh		1.50
Cartersville, Ga. — Analysis, 68% $CaCO_3$, 32% $MgCO_3$; pulverized		3.00
50% thru 100 mesh		1.75
Chaumont, N. Y. — Pulverized limestone, bags, 4.00; bulk		2.50
Chico, Texas—Pulverized		2.50
Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk		4.00
Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk		3.00
Hillsville, Penn. — Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk		3.50
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk		2.50
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk		2.70
Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk		2.75
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.10; bulk		3.60
Marion, Va. — Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton		2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@	4.50
Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags		5.00
Olive Hill, Ky.—90% thru 100 mesh		2.00
90% thru 4 mesh		1.00
Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)		5.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@	2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk		3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk		5.50
Waukesha, Wis.—Pulverized		4.00
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; bags, 4.00; bulk		2.50
West Stockbridge and Rockdale, Mass., Danbury, Conn. — Analysis, 90% $CaCO_3$, 5% $MgCO_3$; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk		3.25

Agricultural Limestone

(Crushed)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50
Bedford, Ind. — Analysis, 97.5% $CaCO_3$, 1.2% $MgCO_3$; 95% thru 100 mesh, 65% thru 40 mesh, 30% thru 100 mesh	1.50
Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Blackwater, Mo.—99% $CaCO_3$; 90% thru 4 mesh	1.00
Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.75
50% thru 4 mesh	1.50

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Agricultural Limestone

(Continued from preceding page)

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh		.80
Chico, Texas — 50% thru 50 mesh, 50% thru 4 mesh		1.00
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh		1.20
Cypress, Ill.—90% thru 100 mesh		1.25
50% thru 100 mesh, 90% thru 50 mesh, 50% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh		1.15
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh		1.50
Garrett, Okla.—All sizes		1.25
Gary, Ill. — Analysis, approx. 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh		.60
Kansas City, Mo.—50% thru 100 mesh		1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh		2.00
Screenings (¾ in. to dust)		1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk		1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@	2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind. — Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh		1.60
Milltown, Ind. — Analysis, 94.41% $CaCO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh, 38% thru 50 mesh	1.45@	1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh		1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh		1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh		1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@	1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh		.75
Waukesha, Wis.—Test, 107.38% bone dry, 100% thru 10 mesh; bags, 2.85; bulk		2.10

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk		3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@	3.50
Waukesha, Wis.—97% thru 100 mesh, bulk		4.00

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton.

Glass Sand:		
Berkeley Springs, W. Va.	2.00@	2.25
Cedarville and S. Vineland, N. J.—Damp		1.75
Dry		2.25
Cheshire, Mass.: 6.00 to 7.00 per ton; bbl.		2.50
Columbus, Ohio	1.50@	2.00
Estill Springs and Sewanee, Tenn.		1.50
Gray Summit and Klondike, Mo.		2.00
Los Angeles, Calif.—Washed		5.00
Mapleton Depot, Penn.	2.00@	2.25
Massillon, Ohio		3.00
Mineral Ridge and Ohlton, Ohio		2.50
Oceanside, Calif.		3.00
Ottawa, Ill.—Chemical and mesh guaranteed		1.50
Pittsburgh, Penn.—Dry		4.00
Damp		3.00
Red Wing, Minn.: Bank run		1.50
Ridgway, Penn.		2.50
Rockwood, Mich.	2.75@	3.25
Round Top, Md.		2.25
San Francisco, Calif.	4.00@	5.00
St. Louis, Mo.		2.00
Sewanee, Tenn.		1.50
Thayers, Penn.		2.50
Utica, Ill.	1.00@	1.35
Zanesville, Ohio		2.50
Miscellaneous Sands:		
Aetna, Ind.:		
Core, Box cars, net, .35; open-top cars		.30
Albany, N. Y.:		
Core		1.25
Molding coarse		2.00
Molding fine, brass molding		2.25
Sand blast		4.00
Arenzville and Tamalco, Ill.:		
Molding fine and coarse	1.40@	1.60
Brass molding		1.75
Beach City, Ohio:		
Core		1.75
Furnace lining		2.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Penn.		1.25		1.50	1.75	
Farmingdale, N. J.	.58	.48	1.05	1.20	1.10	
Hartford, Conn.	.65*					
Machias Jct., N. Y.		.75	.75	.75	.75	.75
Montoursville, Penn.	1.00@1.10	1.10@1.25		.85	.75	.75
Northern New Jersey	.50	.50	1.35	1.25	1.25	
Olean, N. Y.		.90	.75	.75	.75	.75
Pittsburgh, Penn., and vicinity	1.25	1.25	1.00	1.00	.85	.85
Shining Point, Penn.			1.00	1.00	1.00	1.00
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.60	.80	.80	.80	.80
Chicago, Ill.	1.35	1.75	1.75	1.75	1.75	1.75
Columbus, Ohio	.75	.75	.75	.75	.75	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.40	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.60@ .80	.40	.80			.85
Elkhart Lake, Wis.	.60	.40	.50	.50	.50	.60
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.50		.80	.70	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.	.40					1.25
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.35	.35	1.35	1.25	1.25	1.25
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.45@ .50	.45@ .50		1.25	1.25	
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65‡	1.45		1.45‡
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.85	.85
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.55	.60	.65	.65
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .40@.60			
Zanesville, Ohio.	.70	.60	.60	.60	.90	.90
SOUTHERN:						
Brookhaven, Miss., Roseland La.	1.75*	.70	2.25	1.50	1.25	
Charleston, W. Va.	All sand 1.40 f.o.b. cars. All gravel 1.50 f.o.b. cars.					
Chehaw, Ala.	00@ .30		.40	.50		
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.00
Macon, Ga.	.50		.75		.65	.65
New Martinsville, W. Va.	.90@1.00	.90@1.00		1.20		.80@ .90
Roseland, La.	.80	.70	1.50	1.50	1.25	1.25
Smithville, Texas		.90	.90	.90	.90	.75
WESTERN:						
Baldwin Park, Calif.	.20	.20	.40	.50	.50	
Kansas City, Mo.	.80	.70				
Los Angeles, Calif.	.50	.50	.92	.92	.92	
Pueblo, Colo.	1.10*	.90*		1.60*		1.50*
San Diego, Calif.	.60	.60	1.20	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50	1.50	1.50	1.50	1.50	1.50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.			Road gravel, ballast gravel .60 a ton			
Chehaw, Ala.	00@ .30					
Des Moines, Iowa		Washed, .65; unwashed, .40 (not screened)				
Dudley, Ky. (crushed silica)		1.10		.90		
East Hartford, Conn.			Sand, .65 per cu. yd.			
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.60		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas						.55
Macon, Ga.		.35				
Mankato, Minn.			Pit run gravel, .50			
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.			Mine run gravel 1.55 per ton			
Shining Point, Penn.			Concrete sand, 1.10 ton			
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10					
Zanesville, Ohio						.55

*Cubic yd.; (b) river run.

Miscellaneous Sands

(Continued from preceding page)

Molding fine and coarse 2.00
Traction unwashed and screened 1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse 5.00
Sand blast 5.00@ 8.00
Stone sawing 6.00
Columbus, Ohio:
Core .30@ 1.50
Traction .30@ .90
Molding coarse 1.25@ 1.50
Furnace lining 1.75@ 2.00
Stone sawing 1.50
Brass molding 2.00@ 2.25
Sand blast 3.50@ 4.50
Dresden, Ohio:
Core 1.25@ 1.50
Molding fine 1.50@ 1.75
Molding coarse 1.50
Traction 1.25
Brass molding 1.75
Eau Claire, Wis.:
Roofing sand 3.00
Sand blast 3.00@ 3.25
Stone sawing 2.50@ 3.00
Traction, wet, .35; dry .65
Elco, Ill.:
Ground silica per ton in carloads 22.00@31.00
Estill Springs and Sewanee, Tenn:
Molding fine and core 1.25
Roofing sand, sand blast, traction 1.35@ 1.50
Franklin, Penn.:
Core, molding fine and coarse, brass molding 1.75
Gray Summit and Klondike, Mo.:
Core 1.75
Molding fine, stone sawing 1.75@ 2.00
Joliet, Ill.:
No. 2 molding sand; also loam for luting purposes and open-hearth work .65@ .85
Kasota, Minn.:
Stone sawing (not screened or dried) 1.25
Mapleton Depot, Penn.:
Molding fine and sand blast 2.00
Traction 2.00@ 2.25
Massillon, Ohio:
Molding fine, coarse, furnace lining core and traction 2.50
Michigan City, Ind.:
Core and traction .30@ .40
Mineral Ridge and Ohlton, Ohio:
Molding fine and coarse, traction, furnace lining, all green 1.60
Core, roofing sand, sand blast, stone sawing, all green 1.75
Montoursville, Penn.:
Core 1.35
Traction 1.10@ 1.35
New Lexington, Ohio:
Molding fine 2.50
Molding coarse 1.50
Oceanside, Calif.:
Roofing sand 3.50
Ottawa, Ill.:
Molding coarse (crude silica sand) .75@ 1.00
Sand blast 3.50
Stone sawing 1.50
Red Wing, Minn.:
Core, furnace lining, stone sawing 1.50
Molding fine and coarse, traction 1.25
Sand blast 3.50
Filter sand 3.75
Ridgway, Penn.:
Core 2.00
Furnace lining, molding fine, molding coarse 1.25
Traction 2.25
Round Top, Md.:
Core 1.60
Traction, damp 1.75
Roofing sand 2.25
St. Louis, Mo.:
Core 1.00@ 1.75
Furnace lining 1.50
Molding fine 1.50@ 2.50

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.35@2.50	1.35@1.70	1.45@1.80	1.35@1.70	1.35@1.70	1.35@1.70	1.35@1.70
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Emporium and Dubois, Penn.	2.35@2.50	1.35@1.70	1.45@1.80	1.35@1.70	1.35@1.70	1.35@1.70	1.35@1.70
Reading, Pa.	2.50	1.00	....	1.25	....	....	....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.45	....	1.45	....	1.45	....
Jackson, Ohio	....	1.05	....	1.30	1.05	1.30	1.05*
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	2.05	1.55	....	1.55	1.55	1.55	1.55*
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

*¼ in. to 1½ in.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	....	....	12.00	....	....	....	....	2.20
Buffalo, N. Y.	....	12.00	12.00	12.00	....	....	....	....
Lime Ridge, Penn.	....	....	....	....	....	....	5.00a	....
West Stockbridge, Mass.	....	10.50	5.60	....	....	....	....	2.25m
Williamsport, Penn.	....	....	10.00	....	....	....	6.00	....
York, Penn.	....	10.50	10.50	11.50	....	....	8.50	1.65i
CENTRAL:								
Cold Springs, Ohio	....	10.00	9.00	....	9.00	11.00	9.00	....
Delaware, Ohio	12.50	10.00	9.00	10.50	9.50	1.35	9.00	1.50
Gibsonburg, Ohio	12.50	....	....	....	9.00	11.00	....	....
Huntington, Ind.	12.50@14.50	10.00	9.00	....	9.00	11.00	9.00	....
Luckey, Ohio (f)	12.50	....	....	....	....	....	....	....
Marblehead, Ohio	12.50	10.00	9.00	12.00	9.00	11.00	9.00	1.50c
Marion, Ohio	....	10.00	9.00	....	....	....	9.00	1.70
Mitchell, Ind.	....	12.00	12.00	12.00	11.00	....	10.00	1.70e
Sheboygan, Wis.	....	....	....	....	....	....	8.50t	....
Tiffin, Ohio	....	....	....	....	9.00	....	....	....
White Rock, Ohio	12.50	....	....	....	....	....	....	....
Woodville, Ohio (f)	12.50	10.00	9.00	12.50	9.00	10.50	9.00	1.50
SOUTHERN:								
Erin, Tenn.	....	....	....	....	....	....	7.80	1.25
El Paso, Texas	....	....	....	....	....	....	9.00	2.00
Graystone, Ala.	12.50	11.00	....	10.00	....	1.35u	8.50	1.50
Karo, Va.	....	10.00	9.00	....	....	....	7.00g	1.65h
Knoxville, Tenn.	20.50	11.00	....	11.00	....	....	8.50	1.50
Varnons, Ala. (f)	....	10.00p	10.00p	....	....	....	8.00q	1.40r
Zuber and Ocala, Fla.	13.00	11.00	10.00	....	12.00	....	....	1.75
WESTERN:								
Kirtland, N. M.	....	....	....	....		....	15.00	....
San Francisco, Calif.	20.00†	20.00†	15.00s	20.00†	....	....	....	2.50o
Tehachapi, Calif.	....	....	....	....	....	....	16.20	....

†50-lb. paper bags, burlap 24.00; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) per 180-lb. barrel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. bbl.; 265, 280-lb. bbl.; (l) bags; (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium, common 1.90; (p) to 11.00; (q) to 8.50; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) in bbls.; (u) two 90-lb. bags.

Miscellaneous Sands

(Continued)

Molding coarse 1.25@ 1.75
Roofing sand 1.75
Sand blast 3.50@ 4.50
Stone sawing 1.25@ 2.25
Traction 1.25
Brass molding 2.00@ 3.00
San Francisco, Calif:
(Washed and dried)—Core, sand blast and brass molding 3.50@ 5.00
Furnace lining and roofing sand 3.50@ 4.50
Molding fine and traction 3.50
Molding coarse 4.50
(Direct from pit)—Core and molding fine 2.50@ 4.50
Sewanee, Tenn.:
Molding fine and coarse, roofing sand, sand blast, stone sawing, traction, brass molding 1.25
Tamms, Ill.:
Ground silica per ton in carloads 20.00@31.00
Thayers, Penn.:
Core 2.00
Molding fine and coarse 1.25
Traction 2.25
Utica, Ill.:
Core, furnace lining, molding coarse, stone sawing .75
Molding fine .55
Utica, Penn.:
Core 2.00
Molding fine and coarse 1.75
Warwick, Ohio.:
Core, molding coarse (green) 2.00; (dry) 2.50; traction 2.50
Zanesville, Ohio:
Core 1.75
Molding fine, brass molding 1.75@ 2.00
Molding coarse 1.50@ 1.75

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:
Crude talc (mine run) 3.00@ 4.00
Ground talc (20-50 mesh), bags 10.00
Cubes 55.00
Blanks (per lb.) .08
Pencils and steel workers' crayons, per gross 1.25
Chatsworth, Ga.:
Crude (for grinding) 5.00
Ground (150-200 mesh) bags 10.00
Pencils and steel workers' crayons, per gross 1.00@ 2.00
Chester, Vt.:
Ground talc (150-200 mesh), bulk 9.00@10.50
Bags 10.50@11.50
Chicago, Ill.:
Ground (150-200 mesh) bags 30.00
E. Granville, Rochester, Johnson, Waterbury, Vt.:
Ground talc (20-50 mesh) bags 7.00@10.00
Ground talc (150-200 mesh) bags 10.00@25.00
Pencils and steel workers' crayons, per gross .75@ 2.00
Emeryville, N. Y.:
(Double air floated) including bags; 325 mesh (50 lb. paper, 100 & 200 lb. burlap bags) 14.75
Hailesboro, N. Y.:
Ground (150-200 mesh) bags 18.00
Ground (200-300 mesh) bags 20.00
Henry, Va.:
Crude talc (mine run) 3.50
Ground talc (150-200 mesh), bags 9.00@14.50
Joliet, Ill.
Ground (200 mesh), bags 30.00
Keeler, Calif.:
Ground (200-300 mesh), bags 20.00@30.00
Marshall, N. C.:
Crude 4.00@ 8.00
Ground (20-50 mesh), bags extra 6.50@ 8.50
Ground (150-200 mesh), bags 8.00@12.00
Natural Bridge, N. Y.:
Ground talc (300-325 mesh), bags 13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72% 4.50@5.00
Mt. Pleasant, Tenn.—B.P.L. 65% 6.50@ 7.00
75% B.P.L. 6.00@ 6.50
75% hand mined 6.50
75% (free of fines for furnace use) 6.50@ 6.75
75% max. 5½% I and A 6.50@ 7.00
78% max. 4½% I and A 8.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L. 5.50
Twomey, Tenn.—B.P.L. 65%, 2000 lb. 7.00@ 8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12, 24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10, 18x10, 18x9, 18x12	12.60	11.00	8.70	8.75
16x10, 16x9, 16x8, 16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x8	11.10	10.50	8.10	7.80
14x7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Ground Rock
(2000 lb.)

Centerville, Tenn.—B.P.L. 65%		7.00
Gordonsburg, Tenn.—B.P.L. 68-72%	4.00@	5.00
Mt. Pleasant, Tenn. — B.P.L. 65% 95% thru 100 mesh		7.00
13% phosphorus, 95% thru 80 mesh		5.75
Twomey, Tenn.—B.P.L., 65%	7.00@	8.00

Florida Phosphate
(Raw Land Pebble)
Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	2.50
70% min, B.P.L., Basis 70%	2.75
72% min. B.P.L., Basis 72%	3.00
75/74% B.P.L., Basis 75%	4.00

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	18.00@19.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.00@20.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per gross ton	18.00

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.‡—English cream	9.00	9.00
English pink	9.00	9.00
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Penn., and Phillipsburg, N. J.—Green granite	16.00@20.00	9.00@15.00
Talc		9.00@11.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags	†12.50	†12.50
Ingomar, Ohio (in bags)		5.00@20.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury, Vt.‡—Middlebury white	9.00	9.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal. — "Natrock" roofing grits		12.00
Tuckahoe, N. Y.		12.00
Villa Grove, Colo		13.00
Wauwatosa, Wis.		16.00@45.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

†C.L. Less than C. L., 15.50.
‡C.L. lots, for L.C.L. add 3.50 per ton. Add 2.00 per ton for bags.

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	16.00@16.50	22.00@50.00
Ensley, Ala. ("Slag-tex")	12.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Milwaukee, Wis.	14.00	30.00@42.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	15.25	21.50
Portland, Ore.	19.00	25.00@45.00
Prairie du Chien, Wis.	14.00	25.00@32.00
Rapid City, S. D.	18.00	25.00@45.00
Watertown, N. Y.	18.00@21.00	35.00@37.50
Wauwatosa, Wis.	14.00	20.00@42.00
Winnipeg, Man.	14.00	22.00

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	14.00@15.50
Brighton, N. Y.	16.75
Dayton, Ohio	12.50@13.50
Farmington, Conn.	14.00
Grand Rapids, Mich.	12.00
Hartford, Conn.	14.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee. Wis.	13.00
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	13.00@13.50
Syracuse, N. Y.	*18.00
Terra Cotta, D. C.	13.50
Wilkinson, Fla.—White	13.00
Buff	17.00

*Mill price, $20.00 delivered.

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore. Md.	24.25	17.85
Boston, Mass.	20.00	14.00@15.00
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	18.00
Dallas, Tex.	20.00	——
Denver, Colo.	24.00	——
Detroit, Mich.	15.50	15.50
Kansas City, Mo.	19.50	18.50
Los Angeles, Calif.	....	18.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	....	21.00
New Orleans, La.	24.00	16.00
New York, N. Y.	18.20	12.00@13.10
Philadelphia, Penn.	23.00	16.00
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	....	22.00
Seattle, Wash. (paper sacks)	24.00	——

Portland Cement

Prices per bag and per bbl. without bags net in carload lots.

	Per Bag	Per Bbl.
Boston, Mass.	....	2.53@3.03*
Buffalo, N. Y.	....	2.48
Cedar Rapids, Iowa	....	2.44
Cincinnati, Ohio	....	2.47
Cleveland, Ohio	....	2.39
Chicago, Ill.	....	2.20
Columbus, Ohio	....	2.44
Dallas, Texas	.53¾	2.15
Davenport, Iowa	....	2.39
Dayton, Ohio	....	2.48
Denver, Colo.	.63¾	2.55
Detroit, Mich.	....	2.35
Duluth, Minn.	....	2.19
Indianapolis, Ind.	——	2.41
Kansas City, Mo.	....	2.17@2.47*
Los Angeles, Cal. (less 5c dis.)	.60	2.60
Louisville, Ky.	....	2.45
Memphis, Tenn.	....	2.60
Milwaukee, Wis.	....	2.35
Minneapolis, Minn.	....	2.42
Montreal, Que.	....	1.90
New York, N. Y.	....	2.15
Omaha, Neb.	....	2.91*
Philadelphia, Penn.	....	2.81*
Pittsburgh, Penn.	....	2.19
San Francisco, Calif.	.65¼	2.71*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.	....	2.42
Seattle, Wash. (10c bbl. dis.)	....	2.65
Toledo, Ohio	....	2.40

NOTE—Add 40c per bbl. for bags.
*Including sacks at 10c each.
†Prices to contractors, including bags.
(a) Less 10c 20 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.	....	1.95
Concrete, Wash.	....	2.35
Dallas, Texas	.52½	2.50*
Hannibal, Mo.	....	2.05
Hudson, N. Y.	....	2.45*
Leeds, Ala.	....	1.95
Nazareth, Penn.	....	1.95
Northampton, Penn.	....	1.95

*Including sacks at 10c each.

Cement Products

Hawthorne tile, carload lots, f. o. b. plant.

	Cicero, Ill. Per sq.	Ft. Worth, Tex. Per sq.
Silver gray	......	8.00
Red French	9.50	9.00
Green French	11.50	10.00
Red Spanish	10.00	9.00
Green Spanish	12.00	10.00

	Cicero Red	Cicero Green	Ft. Worth Gray	Ft. Worth Red	Ft. Worth Green
Ridges	.25	.35	.25	.25	.30
Hips	.20	.30	.14	.14	.17
Ridge closers	.05	.06	.06	.06	.06
Hip terminals, 3 way	1.25	1.50	1.00	1.00	1.25
Hip starters	.50	.60	.22	.22	.25
Gable finials	1.25	1.50	1.00	1.00	1.25
Gable starters	.20	.30	.14	.14	.16
End bands	.20	.30	—	—	—
Eave closers	.06	.08	.06	.06	.06

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board ¼x32x36". Wt. 1500 lb. Per M Sq. Ft.	Plaster Board ⅜x32x36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Centerville, Iowa.	3.00	4.00	8.00	7.00	10.00	9.50	10.00	....	25.80	11.00	....	....	....
Douglas, Ariz.	....	....	7.00	....	16.50		19.50	....	....	15.50	....	....	....
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	....	26.55	20.00	....	....	....
Gypsum, Ohio‡	3.00	4.00	6.00	9.00	9.00	9.00	18.00	7.00	30.15	20.00	....	20.00	30.00
Hanover, Mont.	....	....	....	11.80	....	....	....	....	....	....	....	....	....
Los Angeles, Calif.	....	....	....	10.50	....	....	12.30	....	....	....	....	....	....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	....	20.00	30.00
Portland, Colo.	....	....	....	10.00	....	....	....	....	....	....	....	....	....
Sigurd, Utah	....	....	....	....	....	....	....	....	18.00a	....	....	....	....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	....	....	....	....	28.50	....	34.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 21.00.

New Machinery and Equipment

New Seven-Ton Locomotive

THE Midwest Locomotive Works of Cincinnati, Ohio, has put a new 7-ton locomotive on the market recently in which especial attention has been paid to the frame construction and its ability

New 7-ton locomotive

to resist shocks. The frame is 40% open-hearth manganese and nickel steel, cast in one piece, thoroughly ribbed and braced in a scientific manner. This frame carries with it a five-year guarantee. A further advantage of the sturdy frame construction is that all the parts are held in correct alignment.

The frame is supported on long flat springs mounted above the axle boxes inside of the frame, a construction which obviates cutting openings in the frame above the axles. The weight of the machine is kept low, the center of gravity being 15 in. above the rail, which is said to decrease track maintenance as well as rendering it difficult for the locomotive to leave the rail.

The power plant is a Climax K. U. 5x6½-in. four-cylinder engine, developing 60 h.p. at 1000 r.p.m. It is equipped with Areo-type Dixie magneto, impulse starter coupling and Stromberg carburetor. There is a built-in governor, adjustable to various speeds, and a Simms 12-volt starting and lighting outfit.

The clutch is of the company's own design and made in its own factory and it has excess capacity (105 h.p.). It is constructed of alternate disks of saw steel and aluminum, the latter filled with cork insets extending through the disk so that both sides are workable. The surface is large enough so that only 5 lb. per square inch of cork surface is needed to transmit the load. The disks are relatively large, being 11¼ in. in diameter.

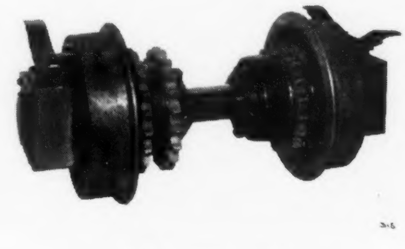
The transmission, which is also of the company's own design and make, is of the selective, sliding gear type, providing four speeds in each direction. It is arranged so that full driving power is obtained in the reverse as well as the forward direction.

All four wheels are drive wheels. They are 18 in. in diameter and have an extra wide face (4 in.) to prevent the engine from leaving the track on short curves or where the track is slightly out of gage.

The frame, cast in one piece, and the power plant

Power is applied directly to the axles through chains and the sprockets are bolted to the wheels and clamped to the axles so that there are no keys to work loose. This stiffens the axle greatly.

Every shaft runs in oversize ball bearings enclosed in dust proof, oil tight housings which will hold sufficient lubricant to care for the bearing six months,



Axle construction

according to the manufacturer's statement.

An excellent construction feature is that all parts are accessible from the top and no screws or bolts are inserted from the bottom.

The Development of Chabelco Chain

By J. C. MERWIN
Works Manager, The Chain Belt Company, Milwaukee

THE development of Chabelco chain is an interesting subject. Even to those who are in touch with us constantly, a review of what has been accomplished in the way of improvements comes as somewhat of a surprise. During the last few years, for example, the tensile strength of some of the sizes has been doubled and the life of the chain increased in about the same proportion as a result of improvements in manufacturing methods, heat treating and grade of steel used in the various parts.

Originally Designed for Concrete Mixers

Chabelco chain was designed originally for use on concrete mixers. Previous to that time practically no chain had ever been used on mixers due to the fact that the old malleable chain would not stand the wear and tear to which construction machinery is subjected. Since the development of Chabelco, chains of this general type are now widely used on both mixers and pavers due to the fact that they resist the destructive force of shocks.

At first the sidebars were made of mild steel and the holes were punched in single operation dies. The bushings and pins were not hardened and the rollers were made of hot rolled steel and were not even smooth on the outside. The first step in the improvement of this type of chain was the case hardening of the pins and bushings

and the substitution of cold rolled steel rollers so that the outside diameter was smooth and close to size. The 1030 size of this chain had a tensile strength of 18,000 lb. and the 1240 a tensile strength of 46,800 lb.

The hardening of the pins and bushings added greatly to the life of the chain, but when the chain finally wore out, it was found that the pins would wear through the sidebars. The next step was the substitution of high carbon steel in the sidebars, which was a distinct improvement. This added materially to the strength of the chain, which now pulled 26,000 lb. for the 1030 size and 56,000 lb. for the 1240 size.

The next step in advance was the adoption of the broaching operation. The sidebars are offset first and then broached. This insures clean smooth holes, absolutely accurate to pitch and size and just as important, too, the holes are parallel. The flats on the pins had always been sheared before, but in order to get the full benefit of the broached holes, the flats on the pins were milled. The swell under the head of the pin was next adopted in order to secure a drive fit in both sidebars.

The Notched Out Sidebar

Close connection with field operating conditions led to the discovery that the pounding action was now the chief cause of the wearing out of the chain. In order to reduce the pounding on the chain running at such a terrific rate of speed, the notching out of the sidebars, to reduce the weight of the chain, was next adopted. When this chain was first put on the market, the idea was ridiculed. The virtue of this improvement, however, was not long in proving itself due to the increased life of the chain, which resulted from the decrease in the weight of the chain.

The case hardened pins and the rollers now were the weakest parts of the chain. So the next step was the adoption of pins made from an alloy steel containing nickel. The rollers which were being made from high carbon, heat treated, cold rolled steel, were changed and were made from a special drawn seamless tubing. This tubing was also high carbon and the rollers were heat treated. The 1030 chain then had a tensile strength of 30,000 lb. and the 1240 65,000 lb.

Everyone was pretty well satisfied with this chain and thought that the limit was about reached. In 1922 one of our engineers went to Madison to the University of Wisconsin to conduct a long series of tests on Chabelco chains. He spent three months at the laboratory, working with one of the university professors, and collected a great deal of information on tensile strength, elongation and other factors that enter into the life of chain of the Chabelco type. As a result of these tests, with a very few changes in design and the adoption of heat-treating operations, there has been developed a No. 1244 Chabelco chain with a tensile strength of over 90,000 lb. And the end is not yet reached.

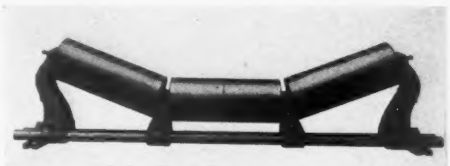
New Belt Conveyor Carrier Developed

RECENTLY a 4½-mile long belt conveyor installation was announced a success. The success of this installation marks a distinct forward step in conveying methods.

Material formerly carried by locomotives and trains of cars is now carried over 4½ miles in a steady unending stream by belt conveyor, eliminating cars, locomotives, tracks, switches and their attendant problems.

For this unusual installation a new carrier or idler had to be developed. Many things had to be considered—cost, power to start and to run, lubrication, upkeep and belt life. From the results announced, this new carrier is a decided advance in belt conveyor carrier design.

This carrier (No. 444) is manufactured



New conveyor carrier

by the Stephens-Adamson Mfg. Co. of Aurora, Ill., and is described by them as follows:

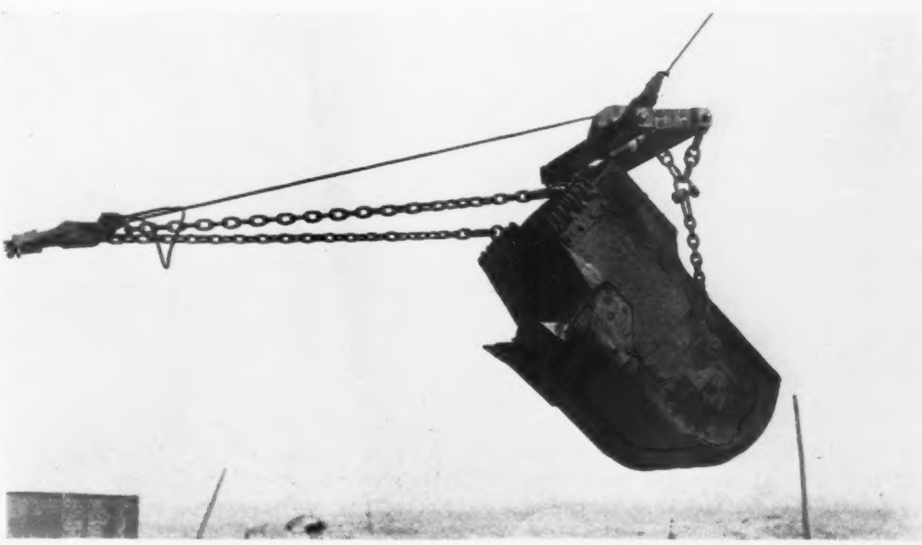
1. This three-pulley straight-line carrier troughs the belt correctly for large capacity and long belt life.
2. Pulleys are of large diameter steel tubing, shafts turn with pulleys and each shaft turns in two ball bearings. By rotating this live shaft in bearings, friction and bearing wear are decreased.
3. Each bearing is totally enclosed in a dust-tight housing. This housing is balanced upon side supporting lugs and is self-aligning.
4. All working loads—radial and end thrust—are taken by ball bearings.
5. Individual high-pressure lubrication is provided for each bearing.
6. Carrier can be swung back out of position and inspected or even removed without stopping belt.
7. Made in sizes for belts from 24 to 60 in. wide.

The Page "Kleen Out" Bucket

THE efficiency of the Page scraper bucket is claimed to be greatly increased by a new type of hoist bail spreader and dump block combined. The usual spreader is replaced by a special one consisting of two channels riveted together by means of two angle irons and placed at the right distance apart to accommodate the plate dump block. The new spreader is placed higher in the hoist bail than the old one and the hoist cable is attached directly above the block. A bridle chain arrangement prevents the spreader from twisting or tilting.

The manufacturers say that the "Kleen Out" Bucket is in no way different from the standard Page scraper bucket except that it has the top partially or entirely covered and it has the special spreader. Therefore, the action in digging remains the same. When the operator starts to hoist the "Kleen Out" Bucket, the tension maintained on the drag cable combined with the lift on the hoist cable draws the point of attachment of the dump cable directly under the dump block in the spreader. This, of course, means the bucket is tilted back until the opening in the front of the bucket is almost straight up. It can be seen very easily that such a bucket would bail water if desired.

The new spreader and block can be put on any Page scraper bucket. It requires no alteration for its operation except an apron or cover on the back. The length of the dump line determines the angle at which the bucket is tilted back when hoisting and carrying. The longer the line, the less the degree of tilt.



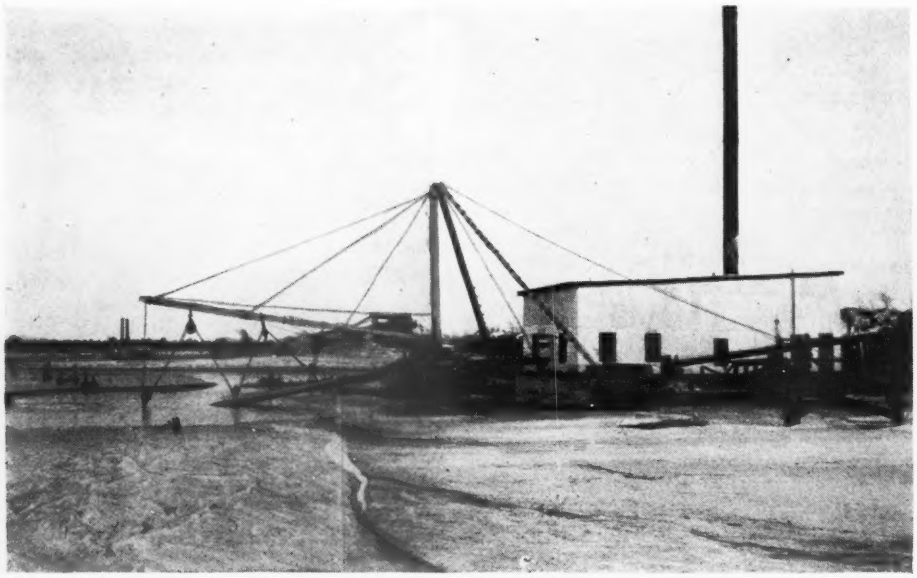
Bucket with new type of hoist bail spreader

New Relay Pumping Plant of the Menantico Sand Co.

THE Menantico Sand Co. of Millville, N. J., had a fire in the early part of last March which burned down the relay pumping plant. This plant was described in ROCK PRODUCTS issue of February 7.

A considerable part of the machinery was found fit for service after the fire, but it was decided to redesign the plant and add some new equipment. The principal feature of this is a new 12-in. pump furnished by the American Manganese Steel Co.

The operation of this relay plant is quite clearly shown in the accompanying picture. The discharge from the dredge, which is operating about 1500 ft. away, is received in the pond at the left of the picture. The sand and water is picked up by the suction of the relay pump which is suspended from the boom of the derrick shown. One man handles the pump and the hoist by which the suction is swung and raised and lowered. The relay pump delivers to a washing plant a short distance away. Power is furnished by boilers and a Corliss engine.



New relay pumping plant of the Menantico Sand Co., Millville, N. J.

S. C. Hadden Executive Secretary of Indiana Sand and Gravel Association

S. C. HADDEN, who is well known for his technical paper and engineering associations, has been appointed executive secretary of the Indiana Sand and Gravel Association. He retains his editorship of *Municipal and County Engineering* and *Indiana Highways and Motors* which he has held for some time.

Mr. Hadden is a civil engineer, graduated from the University of Illinois in 1905. He has been connected with a number of important track, bridge and structural jobs as designing and consulting engineer. For two years he was in charge of the design and installation of the East Lansing, Mich., complete water works and sewerage system and sewage treatment plant. During this period he was assistant professor of mathematics and civil engineering at Michigan Agricultural College. He was senior instructor in the same branches at this college during an earlier period.

Mr. Hadden is a member of various national and local engineering and technical societies and has a wide acquaintance among those who are engaged in technical journalism and engineering work. It would be hard to find anyone better fitted for the position he now holds, both by his previous experience and the contacts he has made in his professional work.

Red River Gravel Producers Association Formed

AN association to be known as the Red River Gravel Producers Association was formed at a meeting of gravel producers from Northern Louisiana, East Texas and Southern Arkansas held at Shreveport, La., on April 13. The first meeting was called at the instigation of the Meriwether Sand and Gravel Co. of Shreveport.

Allen Drew of the Drew Gravel Co., Minden, La., was elected president, F. W. Peck of the Muncie Sand Co., Kansas City, Mo., vice-president and Don C. Laflin of Williams-Laflin Sand and Gravel Co., Texarkana, secretary-treasurer.

With the exception of one concern, every producer in the territory accepted the invitation to attend the first meeting, and since that time the one concern who failed to send a representative has written the members that he would be agreeable to joining same. Regular stated meetings have not been announced yet and for the present, meetings will be called at the discretion of the president, at which time by-laws and articles will be established.

A committee on by-laws and constitution, composed of F. W. Peck, D. S. Clements and Mr. Braswell, has been appointed to report at the next meeting.

Objects of Association

The principal objects of this association are no different than any other gravel producers, representation practically the same conditions hold good in this territory as are in other territories and the demoralizing effect of unorganized producers has been keenly felt in this territory up to the time that this association was formed. The association proposes to hold meetings at stated intervals at which time the producers will personally attend, or send amicable representatives to discuss the various items of local interest connected with the industry in open meeting, with the ultimate view of understanding each other, and the establishment of the most amicable relations that could exist between concerns engaged in the same industry; the procuring of agreeable freight rates, and the protection of the producer who has the misfortune of having a prohibitive freight rate into certain zones; the assistance given by one concern to another in the lending of certain parts of surplus equipment to a competitor whenever it is impossible to immediately procure this particular piece of equipment from a machine shop, thereby eliminating the possibility of a shut-down of operations at the respective plants.

Others attending the meeting were: H. C. Drew, L. T. Drew, S. B. Gilbert, of the Drew Gravel Co., Minden, La.; J. C. Young, of the Texarkana Gravel Co., Texarkana; C. F. Pinson, H. E. Webb and E. W. Kiggins, of Shreveport; T. E. Stephenson, of the Monroe Sand and Gravel Co., Monroe, La.; J. H. Bevel, of the Bevel Gravel Co., Haynesville, La.; D. Tilson, of the Texas Sand and Gravel Co., Texarkana; Fordyce Kimbell and C. H. McFarland, of the Shreveport Gravel Co., Shreveport; Ashton Glassell, of the Standard Gravel Co.; J. M. Jenkins and H. B. Bozeman, of the Southern Mineral Co., Winnfield, La.

Volume of Current Construction

ACCORDING to the *Constructor's* figures the volume of construction for the first four months of 1925 is 6% behind the volume in 1924. On the other hand the building contracts awarded in March were greater than in any month in any year. The volume of building permits issued in March were 42% greater than in February, indicating that a large amount of proposed building has not yet reached the award stage.

The combined yardage of concrete surface pavements is the greatest awarded in any three months, for January, February and March, exceeding last year's awards for the same months by 9%.

News of All the Industry

Incorporations

American Hume Concrete Pipe Co., Detroit, Mich., capital stock $100,000.

Wilmington Granite Co., Wilmington, Del., $25,000. (Gay R. Ford, Wilmington.)

Estill Sand and Gravel Co., Louisville, Ky., increased its capital from $35,000 to $110,000.

Harbor Sand and Gravel Co., Aberdeen, Wash., capital $15,000; by Frank J. and M. H. Monohan.

Rock Asphalt Corporation, Wilmington, Del., $1,500,000, quarrying. (Corporation Trust Co. of America.)

Ernest Thomas Cast Stone Co., Portland, Ore., capital $45,000, by Ernest Thomas, Marie Thomas and Herman Bayer.

Shreveport Gravel Co., Shreveport, La., capital $10,000. Fordyce Kimball is president; Chas. Henry McFarland, secretary.

Jonesville Gravel Co., Ft. Wayne, Ind., capital $40,000, by Ernest G. Willemin, John F. Brooks and Lester E. Ginn.

Pinellas Tile Co., St. Petersburg, Fla., capital $100,000; Karl B. O'Quinn, president and Raney H. Martin, secretary.

Acme Gravel Co., San Francisco, Calif, capital stock $100,000, by E. P. Hulme, E. Wright, R. Ferbeck, A. M. Cole and G. L. Dillman.

Cajon Lime Products Co., Riverside, Calif., capital stock $150,000; by B. R. Parrott of Los Angeles; B. B. Bricker and W. F. Warner of Riverside.

Hempstead Concrete Products Co., Hempstead, N. Y., $10,000; S. Sulin, W. Z. Ymios and S. Posselt. (Attorney, F. M. Holahan, 232 Broadway, Manhattan.)

Bestever Sand and Gravel Co., New York, 301 common, no par; L. C. Myers, C. M. Chute and B. D. Cohen. (Attorneys, Almy, Van Gordon and Evans, 46 Cedar street.)

Connecticut Granite Co., Groton, Conn., capital $50,000, by Ira S. Avery, of Groton, Attorney Nathan Belcher and Alfred D. Forbes, both of New London, Conn.

Cincrete Co., Inc., Clarksburg, W. Va., capital $15,000 by Boyd S. Flemming and T. W. Horner. Will operate plant at 1192 W. Pike street, capacity 2000 cinder cement blocks daily.

New England Gypsum Co., Boston, Mass., $100,000; to mine, quarry, crush and prepare for market gypsum and other kinds of mineral substances and stones. President, Harland B. Newton; treasurer, Fred S. Deering, 149 Appleton street, Boston, and Willard D. Estabrook.

Kaw River Sand Co., Kansas City, Mo., capital $10,000, to dredge, buy and sell, sand and gravel and manufacture cement products. Capital $10,000, by Frank M. Henry, 3816 Genesee street, Wm. J. Stewart and Fred M. Colburn. (Attorneys, Harkless & Hispect, 1000 Grand Avenue Temple, Kansas City.)

Crystal Marble, Lime and Cement Co., Lewiston, Idaho, capital stock $150,000. Incorporators are E. A. White, W. L. Isbell and J. M. Gilmore. The company was formed to develop 160 acres of marble and limestone deposits which it has acquired in Bedrock canyon, along the upper Clearwater river, near Lewiston.

Black Marble and Lime Co. Enterprise, Ore., capital stock $100,000; to produce lime on the holdings of former Oregon Black Marble Co. near Joseph. Officers of the company are L. E. Jordan, president; H. D. Davidhizar, vice-president; I. E. Snyder, secretary. Directors are J. R. Leslie, S. D. Keltner, J. A. Burleigh and H. S. Gibson.

Sand and Gravel

Tarbell Transfer Co., Phoenix, Ariz., has begun the operation of its new washed sand and gravel plant and operating a fleet of trucks for delivery service.

Three gravel pits have been purchased or leased by Washington county, Ohio, and will be used by the county for producing its road building material.

Jonesville Gravel Co., Jonesville, Mich., is rushing work in preparation preparing to wash, grade and ship sand and gravel from its pit on the Holt farm near Jonesville.

A gravel pit in Walla Walla county, Wash., formerly used in connection with state highway construction, has been taken over by that county, along with some machinery, for county road work.

Wissota Sand and Gravel Co., Anson, Wis., has installed considerable new machinery in its plant and resumed operations for the season with advance ordres for over 15,000 tons of gravel.

New Lexington Sand Co., New Lexington, Ohio, has opened a new molding sand plant just east of Bremen on the Pennsylvania and New York Central railroads. The plant is said to have cost $40,000.

Ambrose Sand and Gravel Co., of which C. T. Aspelmeier is general manager, has discontinued its office in Denison, and has established the main office in Bonham, Tex. The gravel pits are at Anthony, Tex.

Indiana Reformatory gravel pit at Pennington, Ind., will be operated using prison labor. Wallace Billingsley, of Shelbyville, Ind., has been selected to superintend operations. A railroad spur is under construction.

Scioto Sand and Gravel Co., Portsmouth, Ohio, has begun operations, taking sand and gravel from the Scioto river. The company was recently organized and is composed of Marvin C. Clark and N. A. Brokaw.

Richardson Sand and Gravel Co., Carpentersville, Ill., suffered a loss of several thousand dollars recently when a fire destroyed the 40 ft. tower, a frame building and a carload of lumber at its plant north of Carpentersville.

Palmer Brothers, Edgerton, Wis., have purchased gravel property at Hartland, Wis., in order to develop it they will construct an underground tunnel under a highway through which to transport the sand and gravel to the railroad.

Waupaca Sand and Gravel Co., Stevens Point, Wis., has made an agreement with Portage county for the operation of the county gravel pit at Lake Emily for a period of five years. The company is to pay the county a royalty of five cents per ton of gravel removed (not less than $1000 per year) and $1000 toward the cost of relocating a highway, changing of which is necessary to operate the pit.

Cement Products

Missouri Portland Cement Co., St. Louis, Mo., will erect a $20,000 one-story, 152 by 32 ft. cement shed at Natural Bridge.

Luis A. Costello is erecting a cement tile plant on property recently purchased just outside the city limits of San Leandro, Calif.

Ash Grove Lime and Portland Cement Co., Kansas City, Mo., has donated 22 lots which it owned at Carthage, Mo., to the city to be developed into a public park.

San Antonio Portland Cement Co., San Antonio, Texas, has let contract for the construction of a $6,566, 40 by 50 ft., concrete, steel and stucco warehouse at Cementville.

Sandusky Portland Cement Co., Sandusky, Ohio, has let a general contract for a one-story storage and distributing plant, 60 by 120 ft. on the Hoaks Mill road, York, Penn., with hoisting, conveying and other material handling equipment.

Diamond Concrete Products Co., Omaha, Neb., has completed an enlargement extension of the curing room of its plant. It is now capable of curing 6000 blocks per day. Frank Whipperman is manager.

Concrete Products Corporation, Milwaukee, Wis., has purchased 6 acres on Canal street on which it will erect a plant to make cinder cement blocks. The new corporation is headed by L. E. Pitner and has headquarters in the Plankinton building.

Jasper Building Supply and Block Co., Jasper, Ind., is now operating its cement products plant, which it recently moved from Dale, Ind., at full capacity. Edward Herr is manager of the company and Harry Buechler, assistant manager. The plant is manufacturing concrete blocks, flower boxes and cases and will be equipped to make other products in the future.

Ideal Cement Stone Co., Omaha, Neb., founded 21 years ago by its president, N. J. Peterson, has grown from a one man hand operation with a maximum daily capacity of 200 blocks per day into a concern operating two plants in Omaha with a combined capacity of 6500 concrete blocks daily, in addition to numerous other cement products. The company has recently begun making cinder concrete blocks and cement roofing tile. Trim stone, garden furniture and other ornamental stone products are also made at the company's plants.

Quarries

A rock crusher has been installed by the city of Grass Valley, Nevada county, Calif., for use in street repairing and improving.

Beyer Crushed Rock Co., Kansas City, Mo., has recently purchased 40 acres of property at Holmes road and 95th street for $45,000.

General Crushed Stone Co., Easton, Penn., has recently added a new steam shovel and a well drill to the equipment at its White Haven, Penn., plant.

Callan Road Improvement Co., South Bethlehem, Penn., recently fired 159 holes, 60 ft. deep, using 75,000 lb. of dynamite and producing 240,000 tons of broken rock. The blast was under the direction of R. H. Nicol, a Du Pont engineer.

Charles Stone Co., Marion, Ill., whose quarry is at Chasco, near Cypress, Ill., has moved its office temporarily from Marion to Mt. Vernon, Ill. According to J. H. Werner, secretary and general namager, the change was made because of the greater amount of road building now under way around Mt. Vernon.

Gypsum

Palmdale Gypsum Co., Palmdale, Calif., plans to build a grinding plant on its five-acre holdings there. George W. Abel is manager of the company.

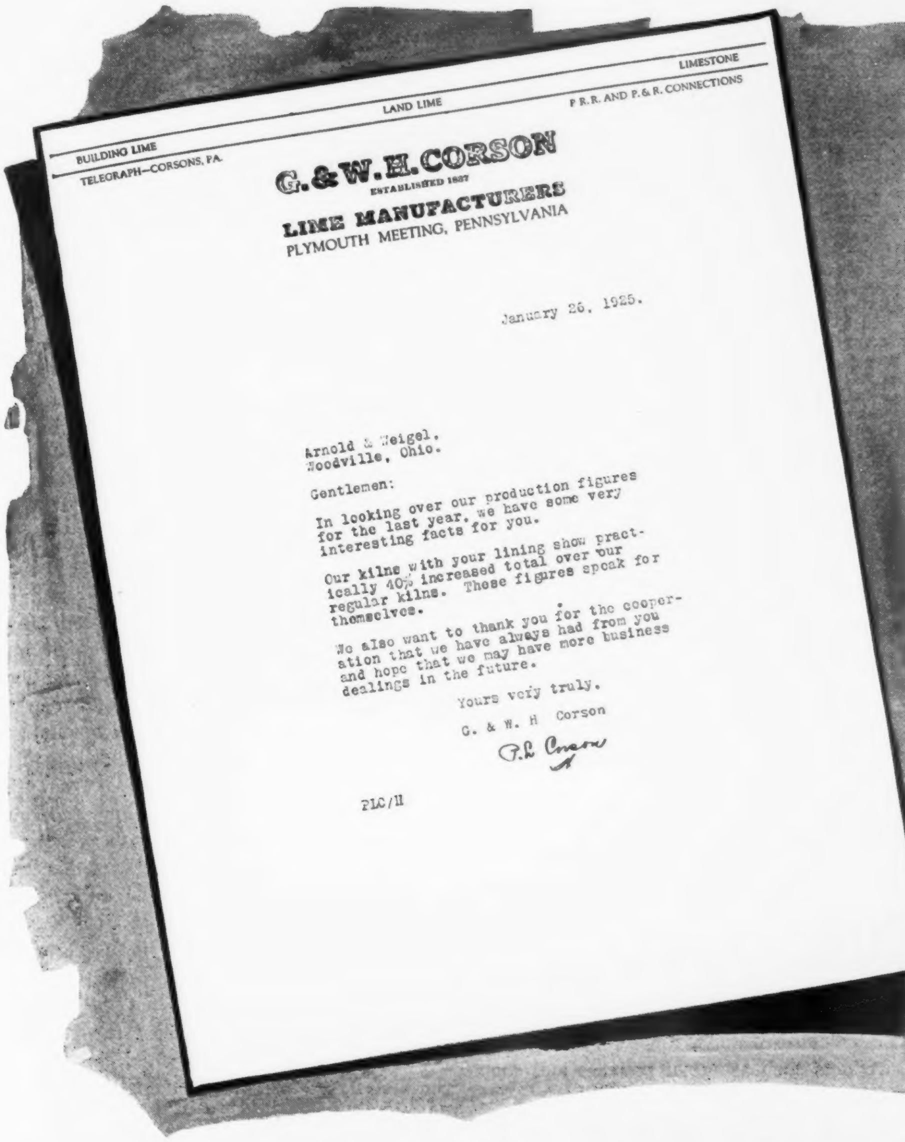
Rock Asphalt

An asphalt deposit recently discovered near Harwood, Mo., is attracting considerable attention in that locality. The deposit is close to the surface and about 25 ft. deep. It is rumored that a company is planning to develop it and is trying to secure the right-of-way for a railroad spur from the deposit to the M. K. & T. tracks at Harwood.

Superior Rock Asphalt Co. of Kentucky will erect a plant and office building at Bowling Green, Ky., and construct a railroad spur from its mines in Logan county to the L. & N. railroad at Auburn, construction to begin in September. The company is capitalized at $1,500,000 and composed of a group of Buffalo financiers. M. M. Logan, Bowling Green, is attorney for the company.

Asbestos

Panhandle Asbestos Co., Kamian, Idaho, has completed the installation of dust collectors at its plant, thus saving dust worth about $100 per ton, according to a statement in a local paper. A. C. Spengler is vice-president of the company and manager of the plant.



BUILDING LIME — LAND LIME — LIMESTONE
TELEGRAPH—CORSONS, PA. — P. R. R. AND P. & R. CONNECTIONS

G. & W. H. CORSON
ESTABLISHED 1837
LIME MANUFACTURERS
PLYMOUTH MEETING, PENNSYLVANIA

January 26, 1925.

Arnold & Weigel,
Woodville, Ohio.

Gentlemen:

In looking over our production figures for the last year, we have some very interesting facts for you.

Our kilns with your lining show practically 40% increased total over our regular kilns. These figures speak for themselves.

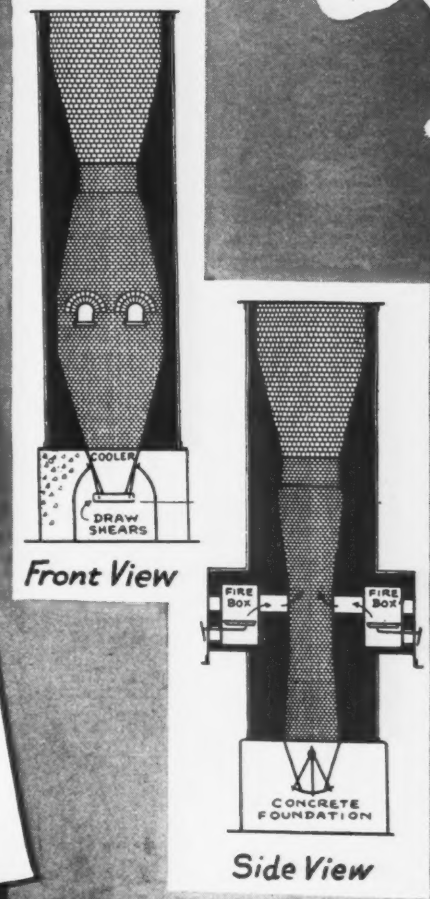
We also want to thank you for the cooperation that we have always had from you and hope that we may have more business dealings in the future.

Yours very truly,

G. & W. H Corson

P.L. Corson

PLC/H



"Increases Production 40%"

The above letter is but one of many we have received from users of Arnold Kilns and Arnold Built Kiln Linings. In every case we have increased production from 40 to 60 per cent. In addition to increasing production, the kiln using Arnold lining will produce a better and more uniform grade of lime with a better fuel ratio.

The Arnold Lining can be installed in kilns using any fuel for burning. In many instances old kilns which were producing poor lime at great expense have been remodeled and by installing "Arnold" linings and adding our standard fire boxes, cooler and other features, these old kilns have paid for their remodeling many times over from the increased tonnage they produced.

Send us your problems, and let us solve them for you.

ARNOLD & WEIGEL
WOODVILLE, OHIO, U.S.A.

Personals

F. W. Mueller, of the Mueller Lumber Co., Davenport, Iowa, was recently elected a director of the Linwood Cement Co. at a meeting of the board of directors. He has been a stockholder in the company for some time.

James A. Hudson has taken charge of the sales department of the Signal Mountain Portland Cement Co., Chattanooga, Tenn. He has recently been with the Portland Cement Association, and has a wide acquaintance in the trade.

W. A. Davis has been elected vce-president and appointed sales manager of the Standard Portland Cement Co., Cleveland, Ohio. The Standard Portland Cement Co. orignally incorporated as the Ohio Portland Cement Co. of Painesville, Ohio, where it is now building a plant.

C. E. Ireland, vice-president and sales manager of the Birmingham Slag Co., Birmingham, Ala., will give an address on the "Processes of Preparation and Commercial Uses of Blast Furance Slag," at the annual meeting of the Birmingham section of the A. S. M. E. on May 19 at the Hotel Hillman, Birmingham.

Earl E. Miller has been appointed by the Sullivan Machinery Co., Chicago, as manager of its El Paso, Texas, branch office to succeed R. S. Weiner, who is transferred to the company's general office at Chicago. Mr. Miller has had more than 13 years' experience with the company at its offices at Denver, Lima, Peru and Paris.

J. W. Hussey, of the Chicago office of the Atlas Portland Cement Co., recently delivered an illustrated lecture to the Rotary Club of Centralia, Ill., on the construction of the Panama Canal. In his talk he discussed some of the engineering problems involved, amounts of materials required and the benefits being realized from this project.

Manufacturers

The Riegel Sack Co. announces the removal of its general offices to the Canadian Pacific Bldg., 342 Madison avenue, New York City.

The Dorr Co., Inc., engineers, announce the removal of their Chicago office to suite 2139, Straus Bldg., 310 South Michigan avenue.

The W. S. Tyler Co., Cleveland, Ohio, has moved its Chicago office to larger quarters in the Straus Bldg. at 310 South Michigan avenue, suite 1008.

Pennsylvania Pump and Compressor Co., Easton, Penn., announces that James McGraw, Inc., 10th and Carey streets, Richmond, Va., has been appointed district representative for the Virginia territory.

Sullivan Machinery Co., Chicago, has moved its Dallas, Texas, office from the Indemnity Bldg., to rooms 522-7 Santa Fe Bldg. Sullivan air compressors, hammer drills and repair parts are carried in stock in the same building, thus permitting improved service. David H. Hunter is manager at this office.

McGann Manufacturing Co., York, Penn., has a contract with E. D. Barnhart and Sons of Mt. Pleasant, Penn., for the design and construction of a lime and hydrating plant using York shaft kilns and Schulthess hydrator. The Barnhart company is building this plant to develop a recently discovered deposit of limestone.

Link-Belt Co., Chicago, announces that after many years of work and study of the problem of standardizing and manufacturing silent chain drives for stock, it has placed in operation a new plan by which complete lines of silent chain drives, of from one-quarter to 10 h.p., in practically any reduction from one to one to seven to one, are now available for immediate delivery by distributors in many principal cities of the country.

Industrial Works, Bay City, Mich., announces the opening of two new district offices, one at 425 Whitney Bldg., New Orleans, La., in charge of John A. Abele and the other at 843-A Hurt Bldg., Atlanta, Ga., in charge of John J. Murphy. The company also announces the appointment of four additional district sales engineers, Douglas J. Calder, Conway J. Neacy and Monroe J. Frankel at the Chicago office in the McCormick Bldg., and Chester F. Delbridge at the St. Louis, Mo., office in the Railway Exchange Bldg.

Traylor Engineering and Manufacturing Co., Allentown, Penn., has recently concluded a contract with the Usines Carels Freres, Societe d'Electricite et de Mecanique, Ghent, Belgium, making arrangements for the manufacture of Traylor equipment in Europe. The foreign sales department of the Traylor company with main offices at 104 Pearl street, New York, will handle the output of the Carels plant in conjunction with its branch offices in London, Johannesburg, Rangoon, Lima, Santiago, Antofagasta, Buenos Aires and other large centers where agencies will be established.

Trade Literature

Schramm, Inc., West Chester, Penn., has issued a new air compressor catalog, C-25-A, showing its complete line of compressor equipment.

Palmer-Bee Co., Detroit, Mich., has issued a new catalog, No. 45, giving information and data on its complete line of spur gear and worm gear reducers.

Pennsylvania Pump and Compressor Co., Easton, Penn., has recently issued bulletin No. 118 in which the air lift method of pumping water by compressed air is discussed and illustrated.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., has published a folder, No. 4657, telling how the C. B. & Q. R. R. successfully constructed structural steel buildings entirely with arc-welded joints.

Hill Clutch Machine and Foundry Co., Cleveland, Ohio, has issued bulletin No. 112, describing its Cleveland type collar oiling bearing. This type bearing is furnished in all styles of rigid, ball and socket mountings, adjustable four ways.

The Kritzer Co., Chicago, has published a booklet on hydrating lime the Kritzer way. The history of lime is touched on, the advantages of hydrated lime are cited and the company's continuous hydrator described and illustrated.

Fairbanks-Morse & Co., Chicago, has issued bulletin H306, describing and illustrating Fairbanks-Morse motors on metal-working machines. The different types of motors manufactured by the company are briefly described and accompanied by a number of illustrations of their applications.

Calcined Alunite Used in Place of German Potash Salts

CALCINED alunite is finding a market as a fertilizer, according to a report in the *Victoria (B. C.) Colonist* on the progress of the San Juan Mining and Manufacturing Co. of Esquimalt, B. C. This company has quarries at Kynquot on the west coast of Vancouver Island and producer calcined alunite along with various by-products such as metal polishes and soap paste.

It is said that a number of tests have been made on the value of the alunite as a fertilizer in western Canada and the United States. When raw alunite was applied to a loam soil for wheat raising, using about 500 lb. to the acre, an increase in the land's production average 16%. The same soil treated with an equal quantity of the calcined alunite resulted in an increased yield averaging 31%. The alumina contained in the mineral is claimed to act as a catalyst.

Alunite is a mineral with potassium, aluminum and sulphuric acid as a basis. An interesting article on alunite deposits and their development appeared in the March 25, 1922 issue of ROCK PRODUCTS on page 38. Particular study is given there of the Marysvale, Utah deposit of the mineral.

California Wants Highway Engineers

THE state civil service commission of California has sent out notices of positions open for highway engineers, foremen, draftsmen and the like, open to all American citizens between 21 and 55 years (in some cases between 21 and 61 years). The last date of filing applications with the commission in Sacramento is May 30.

Making Ferro-Phosphorus in the Electric Furnace

[The manufacture of ferro phosphorus in the electric furnace has become a great interest to producers of phosphate rock not only because of the small but steady market it provides for phosphate rock, but because it is one of the successful methods of producing phosphoric acid by heat. The following description of the process is taken from an article by Theodore Swann, who has made an important commercial success of the method, in *Mining and Metallurgy*.—The Editors.]

THE raw materials used in the manufacture of ferrophosphorus consist of phosphate rock, coke, silica and iron scrap. The phosphate rock may be of the high grade commonly used in the manufacture of fertilizer, although a material containing higher percentages of silica than may be used in fertilizer manufacture has been found satisfactory. The excess of silica is not objectionable because it combines with the lime in the phosphate rock and is withdrawn with the slag, in reality reducing the amount of silica that would otherwise be added.

Phosphorus could be extracted from the rock by heating it with coke or sand, but an inspection of the heat of the reactions involved shows that the reactions that use coke and sand together give the lowest temperature and the smallest heat of reaction. Part of the phosphorus liberated is absorbed by the iron, thus making ferrophosphorus.

The metal and the slag from the furnace are tapped together. From the tap hole the products run into a large iron chill in which the metal remains, the slag floats and overflows into a bed of sand, where it is chilled and broken up. The slag carries with it a certain amount of phosphorus, but the loss can be minimized by proper burdening. The ferrophosphorus after cooling is removed from the chill and broken in pieces for easy handling.

In the production of high-grade ferrophosphorus a large excess of phosphorus must be charged and the losses by volatilization become very large. For this reason a closed furnace is used, which permits drawing off the vapors of phosphorus through a gas main. By admitting air and moisture into these vapors, phosphorus pentoxide and then orthophosphoric acid is formed. The orthophosphoric acid is collected by condensation and electric precipitation with the Cottrell precipitator.

The Hazards of Peace

HARRY SLADER, an employe of the Rockland and Rockport Lime Corp., Rockland, Me., recently received a painful injury while barring down one of the company's gas-fired kilns. A mass of lime fell inside the kiln, striking end of bar, causing it to fly upward at holding end, striking him in the nose and tearing away the cartilage.